SSD Parvex SAS
8, avenue du Lac - B.P. 249
F-21007 Dijon Cedex
www.SSDdrives.com

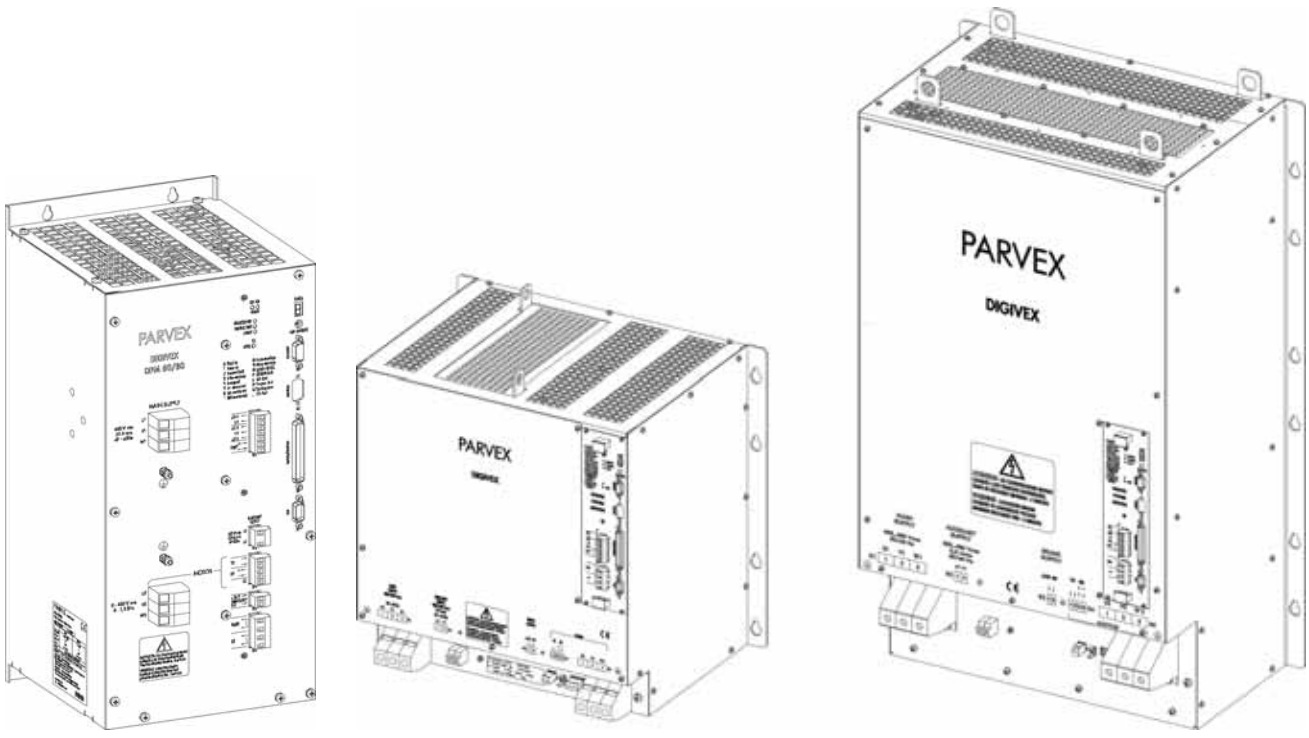
PARVEX

DIGIVEX Power Motion

Digital servoamplifier

User and commissioning manual

PVD 3522 GB – 04/2004



PRODUCT RANGE

1 - « BRUSHLESS » SERVODRIVES

TORQUE OR POWER RANGES

- **BRUSHLESS SERVOMOTORS**, LOW INERTIA, WITH RESOLVER
  Very high torque/inertia ratio (high dynamic performance machinery):
  - ⇒ NX -HX - HXA — 1 to 320 N.m
  - ⇒ NX - LX — 0,45 to 64 N.m

  High rotor inertia for better inertia load matching:
  - ⇒ HS - LS — 3,3 to 31 N.m

  Varied geometrical choice :
  - ⇒ short motors range HS - LS — 3,3 to 31 N.m
  - ⇒ or small diameter motors : HD, LD — 9 to 100 N.m

  Voltages to suit different mains supplies :
  - ⇒ 230V three-phase for «série L - NX»
  - ⇒ 400V, 460V three-phase for «série H - NX»
- **"DIGIVEX Drive" DIGITAL SERVOAMPLIFIERS**
  - ⇒ SINGLE-AXIS DSD
  - ⇒ COMPACT SINGLE-AXIS DµD, DLD
  - ⇒ POWER SINGLE-AXIS DPD
  - ⇒ MULTIPLE-AXIS DMD
- "PARVEX MOTION EXPLORER" ADJUSTING SOFTWARE

2 - SPINDLE DRIVES

- **SPINDLE SYNCHRONOUS MOTORS**
  - ⇒ "HV" COMPACT SERIES
  - ⇒ "HW" ELECTROSPINDLE,frameless, water-cooled motor — From 5 to 110 kW up to 60,000 rpm
- **"DIGIVEX" DIGITAL SERVOAMPLIFIERS**

3 - DC SERVODRIVES

- **"AXEM", "RS" SERIES SERVOMOTORS** — 0.08 to 13 N.m
- **"RTS" SERVOAMPLIFIERS**
- **"RTE" SERVOAMPLIFIERS** for DC motors + resolver giving position measurement

4 - SPECIAL ADAPTATION SERVODRIVES

- **"EX" SERVOMOTORS** for explosive atmosphere
- "**AXL" COMPACT SERIES SERVOREDUCERS** — 5 to 700 N.m

5 - POSITIONING SYSTEMS

- **Numerical Controls** « **CYBER 4000** » 1 to 4 axes
- **"CYBER 2000"** NC 1 to 2 axes
- **VARIABLE SPEED DRIVE - POSITIONER**
  - ⇒ SINGLE-AXIS DSM
  - ⇒ POWER SINGLE-AXIS DPM
  - ⇒ MULTIPLE-AXIS MM
- ADJUSTMENT AND PROGRAMMING SOFTWARE PARVEX MOTION EXPLORER

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Characteristics and dimensions subject to change without notice.

YOUR LOCAL CORRESPONDENT

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8 Avenue du Lac / B.P 249 / F-21007 Dijon Cedex
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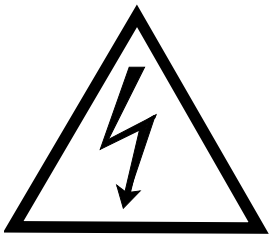
www.SSDdrives.com

SAFETY

Servodrives present two main types of hazard :

- **Electrical hazard**



Servoamplifiers may contain non-insulated live AC or DC components. Users are advised to guard against access to live parts before installing the equipment.

Even after the electrical panel is de-energized, voltages may be present for more than a minute, until the power capacitors have had time to discharge.

Specific features of the installation need to be studied to prevent any accidental contact with live components :
- Connector lug protection ;
- Correctly fitted protection and earthing features ;
- Workplace insulation
  (enclosure insulation humidity, etc.).

General recommendations :

- Check the bonding circuit;
- Lock the electrical cabinets;
- Use standardised equipment.

- Mechanical hazard

Servomotors can accelerate in milliseconds. Moving parts must be screened off to prevent operators coming into contact with them. The working procedure must allow the operator to keep well clear of the danger area.

All assembly and commissioning work must be done by **qualified** personnel who are familiar with the safety regulations (e.g. VDE 0105 or accreditation C18510).

Upon delivery

All servoamplifiers are thoroughly inspected during manufacture and tested at length before shipment.

- Unpack the servoamplifier carefully and check it is in good condition.
- Also check that data on the manufacturer's plate complies with data on the order acknowledgement.

If equipment has been damaged during transport, the addressee must file a complaint with the carrier by recorded delivery mail within 24 hours.

Caution :

The packaging may contain essential documents or accessories, in particular :

- User Manual,
- Connectors.

Storage

Until installed, the servoamplifier must be stored in a dry place safe from sudden temperature changes so condensation cannot form.

Special instructions for setting up the equipment

	CAUTION
	For this equipment to work correctly and safely it must be transported, stored, installed and assembled in accordance with this manual and must receive thorough care and attention. Failure to comply with these safety instructions may lead to serious injury or damage. The cards contain components that are sensitive to electrostatic discharges. Before touching a card you must get rid of the static electricity on your body. The simplest way to do this is to touch a conductive object that is connected to earth (e.g. bare metal parts of equipment cabinets or earth pins of plugs).

1. GENERAL PRESENTATION

1.1 List of published DIGIVEX Motion manuals

♦ DIGIVEX Single Motion (DSM) User Manual	(DSM)	PVD3515
♦ DIGIVEX Power Motion (DPM) User Manual	(DPM)	PVD3522
♦ DIGIVEX Multi Motion (DMM) User Manual	(DMM)	PVD3523
♦ DIGIVEX Motion - CANopen		PVD3518
♦ DIGIVEX Motion - Profibus		PVD3554
♦ PME-DIGIVEX Motion Adjustment Manual		PVD3516
♦ DIGIVEX Motion Directory of Variables		PVD3527
♦ DIGIVEX Motion Programming		PVD3517
♦ DIGIVEX Motion - Cam Function		PVD3538
♦ PME Tool kit User and Commissioning Manual		PVD3528
♦ CANopen - CAN Bus Access via CIM03		PVD3533
♦ CANopen - Remote control using PDO messages		PVD3543
♦ "Block Positioning" Application Software		PVD3519
♦ "Fly shear linear cutting" software application		PVD3531
♦ "Rotary blade cutting" software application		PVD3532
♦ Motor user's manuals:		
◊ HX/HS/HD		PVD3490
◊ NX		PVD3535
◊ HW		PVD3496

1.2 General Concepts of «DIGIVEX Power Motion»

"DPM" servoamplifiers are designed to control magnet-type synchronous brushless motors from the NX and H ranges.
A box-type electronic control system including :

- ♦ A power supply function with direct 400V or 480V/50-60Hz mains input and 550V DC bus voltage output This module also controls energy regeneration to the mains network..
- ♦ A servomotor control function (power and resolver), for axis or spindle drive motors.

They are designed to provide:

- positioning or synchronization functions from,
  - ♦ either the motor resolver,
  - ♦ or an external incremental encoder
- plc-type logic functions
- message or parameter transfers via a CANopen or Profibus field bus.

Parameters specification (current, speed, position) and programming (pseudo BASIC or applicative programs) are done by PC with "PME - DIGIVEX Motion" software (under WINDOWS).

A 7-segment display provides a direct readout of the main drive status.

1.3 System components

A DPM drive system comprises as a minimum:

- A DPM drive-positioner, 480V three-phase, or 400 V three-phase supply depending on the product number
- A mains filter for compliance with CE requirements
- An H or NX series (400V/460V supply) brushless motor with a resolver-type position sensor and thermal protective sensor. The motor may be equipped with a brake (see motor code).
- An auxiliary AUX power supply for the regulation section of the DPM,
- A control unit for activating the stored programs via DPM inputs / outputs (contacts, push buttons, and possibly an external plc).

It may also feature:

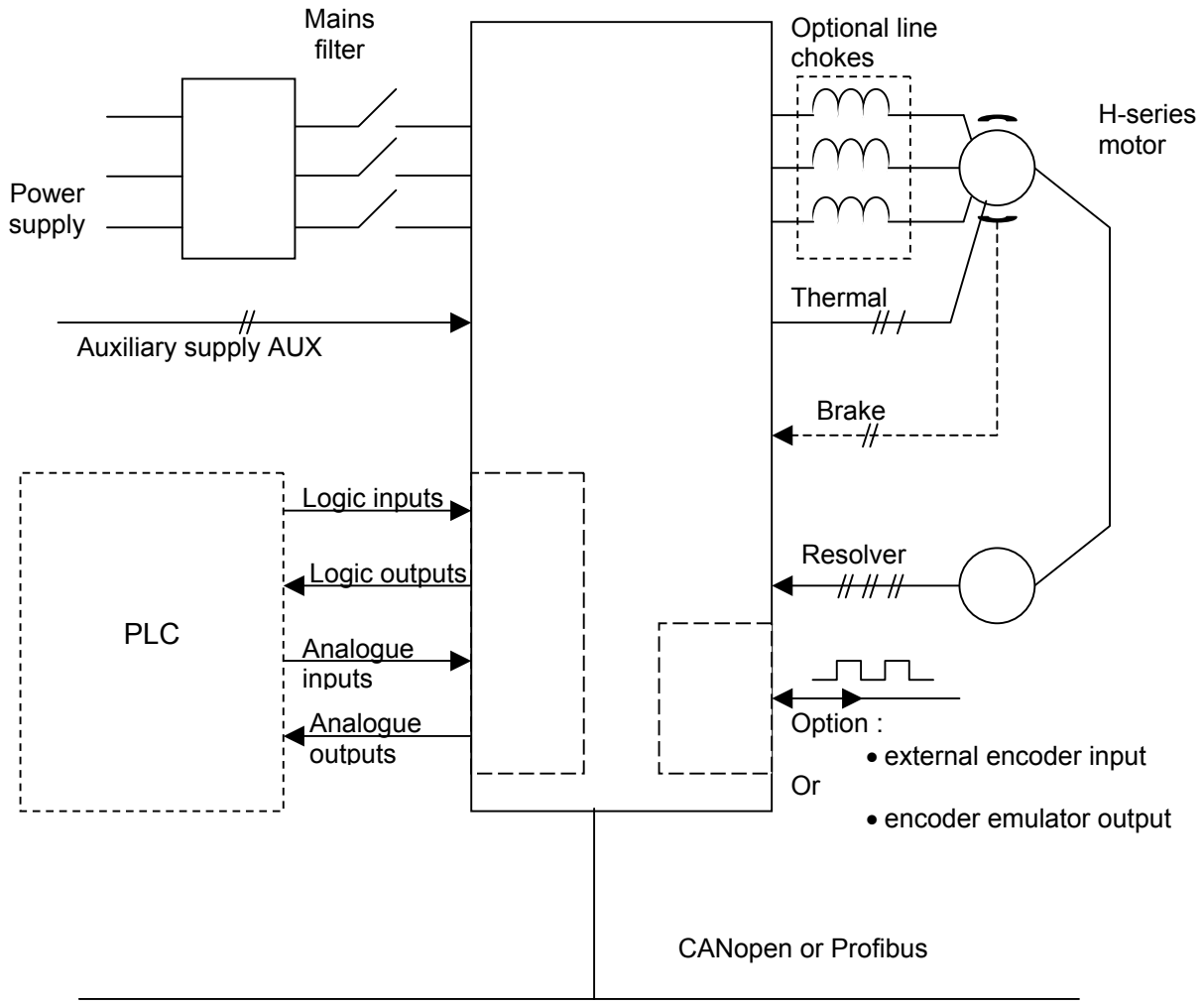
- Additive chokes located close to the drive between the motor and drive where long cables are used.
- An option
  - ♦ "external encoder input" for "master-slave" type operations or for applications requiring position acknowledgement on the machine and not the motor.

  OR

  - ♦ "encoder emulation output" (with resolution adjustable from 1 to 16,384 marks per revolution).
- A µVision terminal for displaying messages or entering digital values (µVision terminal connected to drive via a CANopen type bus).
- Connection cables (supplied by Parvex).

Regulation parameter specification, drive setting and user program entry or modification is done exclusively by PC with PME-DIGIVEX Motion software.

The drives are fitted, depending on the reference, with CANopen (DPMxxxxxC) or Profibus (DPMxxxxxP) communication inputs as standard.


Mains
filter
Optional line
chokes
H-series
motor
Power
supply
Thermal
Auxiliary supply AUX
Brake
Logic inputs
Logic outputs
Resolver
PLC
Analogue
inputs
Analogue
outputs
Option :
• external encoder input
Or
• encoder emulator output
CANopen or Profibus

2. GENERAL CHARACTERISTICS

2.1 Mains characteristics

DIGIVEX Power Motion RATING Ô	DPM 50/80	DPM 100/120	DPM 150	DPM 200	DPM 300
Frequency	48 to 62 Hz				
Minimum voltage	200 V rms.				
Maximum voltage	530 V rms				
Usual voltage	400/480 V +/- 10%				
Rated rms current	32 A	64 A	100 A	130A	200A
Direct voltage Gleichspannung	270 to 750 V				

The system can be operated with 230V rms mains supply but the speeds and powers shown in the motor/servoamplifier characteristics are no longer achieved.

An external mains filter is required for compliance with electromagnetic compatibility requirements.

The DIGIVEX Power Motion supply features IGBT transistors. Braking energy is returned to the mains supply.

Mains monitoring :

- no phase,
- overcurrent.
- Voltage between phases too great

2.2 Servoamplifier General Characteristics

TYPE	MAINS	BUS RATED VOLTAGE	CONTROLLABLE POWER	BRAKING CAPACITY BY REGENERATION TO NETWORK	PEAK PERMANENT CURRENT	PEAK PULSE CURRENT
DPM 50/80	400/480 V 3ph 50/60 Hz Max 480 + 10%	550 V	20 kW	20 kW	50 A	80 A
DPM 100/120	400/480 V 3ph 50/60 Hz Max 480 + 10%	550 V	40 kW	40 kW	100 A	120 A
DPM 150	400/480 V 3ph 50/60 Hz Max 480 + 10%	550 V	60 kW	60 kW	150 A	150 A
DPM 200	400/480 V 3ph 50/60 Hz Max 480 + 10%	550 V	80 kW	80 kW	200 A	200 A
DPM 300	400/480 V 3ph 50/60 Hz Max 480 + 10%	550 V	120 kW	120 kW	300 A	300 A

(*) UL and c UL required: Power is limited to 16kW
An external fan is required to achieve the stated performances for the DPM 200 and 300 (see Section 4.4 "Accessories")

	DPM 50/80	DPM 100/120	DPM 150	DPM 200	DPM 300
POWER DISSIPATED IN KW	0,7	1	1,2	1,6	2,4
LOW-LEVEL CONSUMPTION IN W	35	40	45	75	100

2.3 General characteristics of the DPM

Power reduction with altitude	Above 1000 m, service power falls by 1% for every 100 m up to a maximum altitude of 4000 m
Operating temperature	Normal use: 0 - 40°C Above 40°C, service power fall by 20% for every 10°C up to a maximum temperature of 60°C. Drive stops when ambient temperature is higher than 60°C
relative humidity	85% (without condensation)
Storage temperature	-30°C to +85°C
Chopping frequency	50/80 and 100/120 : 8kHz 150-200-300 : 4KHz
Current bandwidth	600Hz to -3dB
Speed bandwidth	Up to 60Hz
Maximum speed	Driven by DIGIVEX : 60,000 rpm
Electrical protection	Galvanic insulation of power bridge Mean current protection in line with drive calibre Pulse current protection of drive and motor Rms current protection of motor Protection against short circuits at bridge output Mains network overvoltage
Mechanical protection	IP20 under IEC 529
Pollution degree	UL: 2: enclosure mounting
Other monitoring	Tracking error Motor temperature Drive temperature No resolver Brake supply Limit switches
User programs Memory sizes	FLASH_DM : 512 Kilobyte PROG_DM : 256 Kilobyte

Communication bus:

- CANopen: DPMxxxxxC reference positioner drives
- Profibus: DPMxxxxxP reference positioner drives

3. COMPLIANCE WITH STANDARDS

DIGIVEX Power Motion

The CE mark of this product is affixed to the front panel (silk-screen printing).

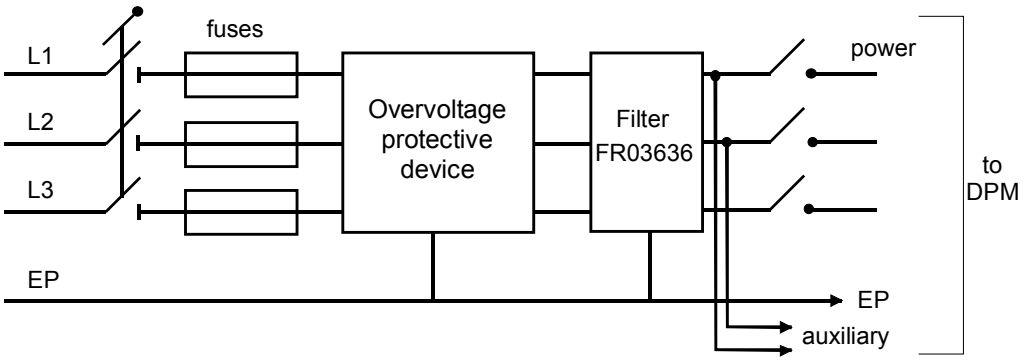
The DIGIVEX Power Motion 100/120, 150, 200, and 300 have the CE marking under the European Directive 89/336/EEC as amended by Directive 93/68/EEC on electromagnetic compatibility as well as under the Electrical Safety Directive of Low Voltage Directive 73/23/EEC amended by Directive no. 93/68/EEC.

The European Directive concerning electromagnetic compatibility refers to the harmonised generic standards EN 50081-2 of December 1993 (Electrical Compatibility - Generic Standard for Emissions - Industrial Environments) and EN 50082-2 of June 1995 (Electromagnetic Compatibility - Generic Standard for Immunity – Industrial Environments). These two harmonised generic standards are based on the following standards:

- EN 55011 of July 1991: Radiated and conducted emissions.
- ENV 50140 of August 1993 and ENV 50204: Immunity to radiated electromagnetic fields.
- EN 61000-4-8 of February 1994: Mains frequency magnetic fields.
- EN 61000-4-2 of June 1995: Electrostatic discharge.
- ENV 50141 of August 1993: Interference induced in cables.
- EN 61000-4-4 of June 1995: Rapid transient.

The Low Voltage Directive groups all the electrical safety standards together including the EN 60204-1 Standard which covers electrical fittings on industrial machinery.

The DIGIVEX Power Motion 50/80 complies with the CEI 1800-3 product standard ("electric power drives with variable speed") with the addition of an external filter in observance of the EN 55011 (radiated and conducted emissions) standard as well as an overvoltage protective device between phases and ground connection in accordance with the diagram below:



Type of overvoltage protective device to be associated with DPM 50/80: 15KA/440V

Compliance with the reference standards above implies observance of the wiring instructions and diagrams provided in this technical documentation which accompanies all equipment.

Incorporation in a machine

The design of this equipment allows it to be used in a machine subject to Directive 98/3 7/EC of 22/06/98 (Machinery Directive), provided that its integration (or incorporation and/or assembly) is done in accordance with trade practices by the machine manufacturer and in accordance with the instructions in this booklet.

UL and c UL conformity

The DIGIVEX Power Motion 50/80 product is certified UL and c UL with the following operating characteristics:

Main voltage	Input current (Arms)	Continuous output power
400V	32A	16 kW
480V	30A	18 kW

(see certificate chapter 7).

Electromagnetic compatibility

The CEI 1800-3 ("electric power drives with variable speed") standard defines the compatibility criteria that have to be observed by an electronic device in an industrial environment. Please find below several important points concerning the harmonic emission rate for drives and the impedance for the mains network to which it is connected.

Harmonic levels

The harmonic content of the mains network currents varies depending on whether the drive consumes power or whether it returns energy to the mains supply. When the drive issues rated voltage, the level of harmonic distortion $\left(THD=\frac{\sqrt{Ieff^2-Ih1^2}}{Ih1} \right)$ is approx. 50%. Contrarily, if the drive returns its rated voltage to the mains supply, the "THD" is approx. 30%.
Please do not hesitate to contact us if you require further information.

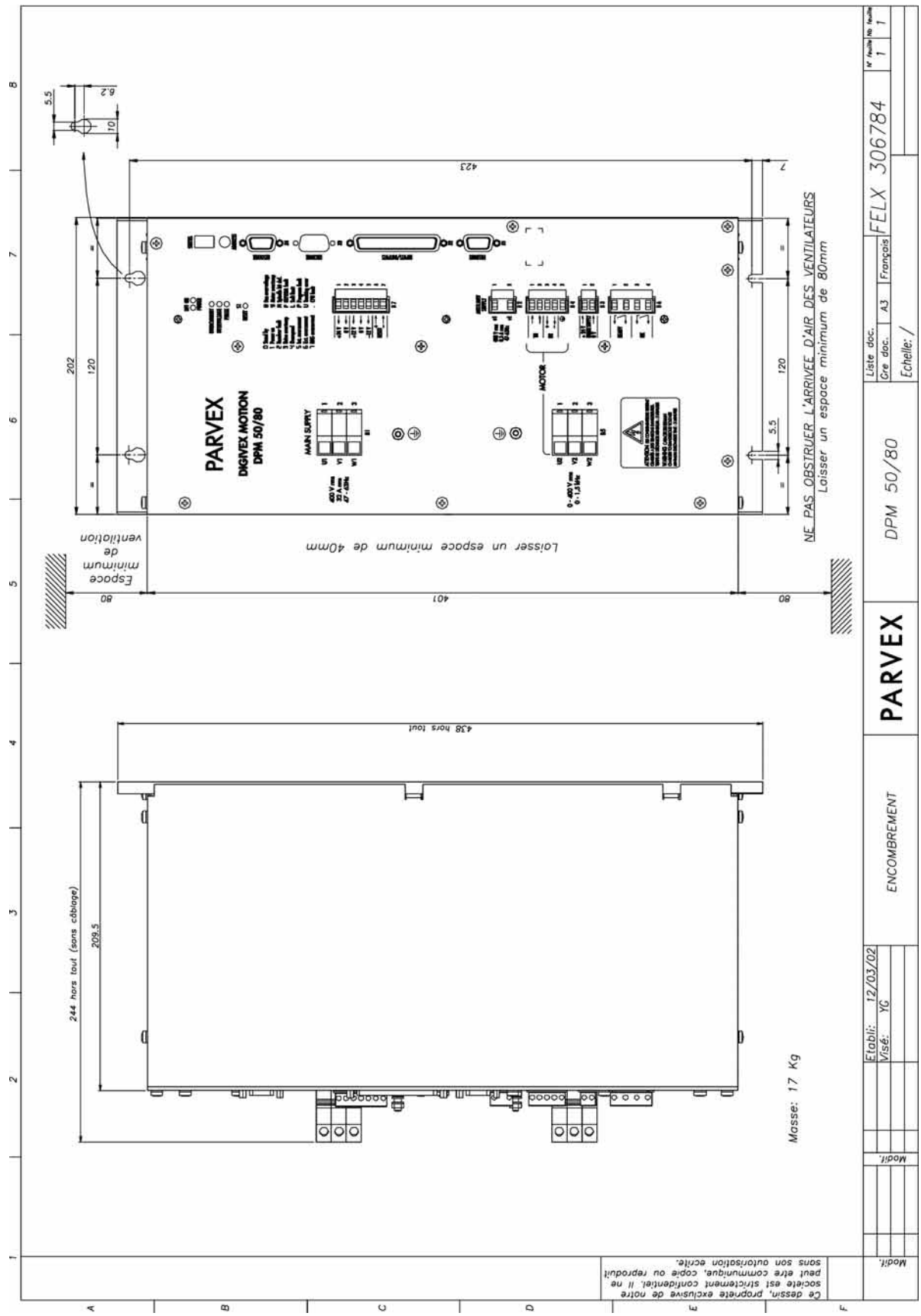
Voltage fluctuation

The repetitive working of a drive consuming then returning electrical energy to the mains supply can produce voltage fluctuations in the mains network to which it is connected. In order for the drive to work properly and to satisfy the limits relative to the "switching slots", the rated voltage of the mains network must be at least equal to three times that of the drive.

4. DIMENSIONS, ASSEMBLY, MASS, LABELLING, CODING

4.1 Dimensions, Assembly and Mass

See next pages, Drawing FELX 306784
FELX 306125
FELX 306127


PARVEX
DIGIVEX MOTION
DPM 50/80
MAIN SUPPLY
MOTOR
NE PAS OBSTRUER L'ARRIVEE D'AIR DES VENTILATEURS
Laisser un espace minimum de 80mm
Laisser un espace minimum de 40mm
Espace minimum de ventilation
423
438 hors tout
244 hors tout (sans câblage)
209.5
202
120
Masse: 17 Kg
Etabli: 12/03/02
Visé: YG
ENCOMBREMENT
PARVEX
DPM 50/80
FELX 306784
Liste doc.
Gre doc.
A3
Français
Echelle: /
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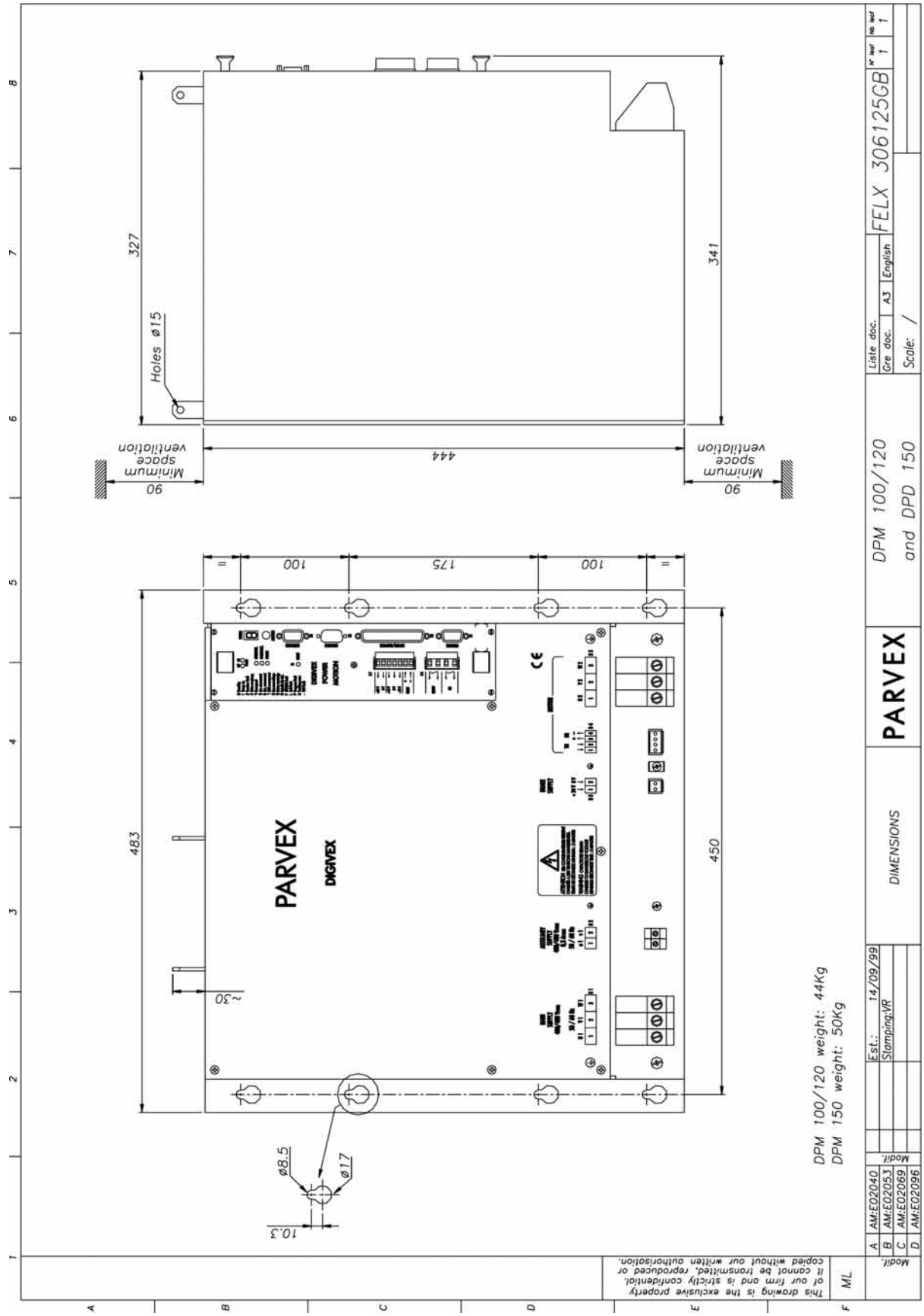
327
Holes ø15
341
444
90
Minimum space ventilation
90
Minimum space ventilation
100
175
100
483
450
~30
PARVEX
DIGIVEX
ø8.5
ø17
10.3
DPM 100/120 weight: 44Kg
DPM 150 weight: 50Kg
DIMENSIONS
PARVEX
DPM 100/120 and DPD 150
FELX 306125GB
Liste doc.
Gre doc.
A3
English
Scale: /
Est.: 14/09/99
Stamping:VR
Modif.
A AM:E02040
B AM:E02053
C AM:E02069
D AM:E02096
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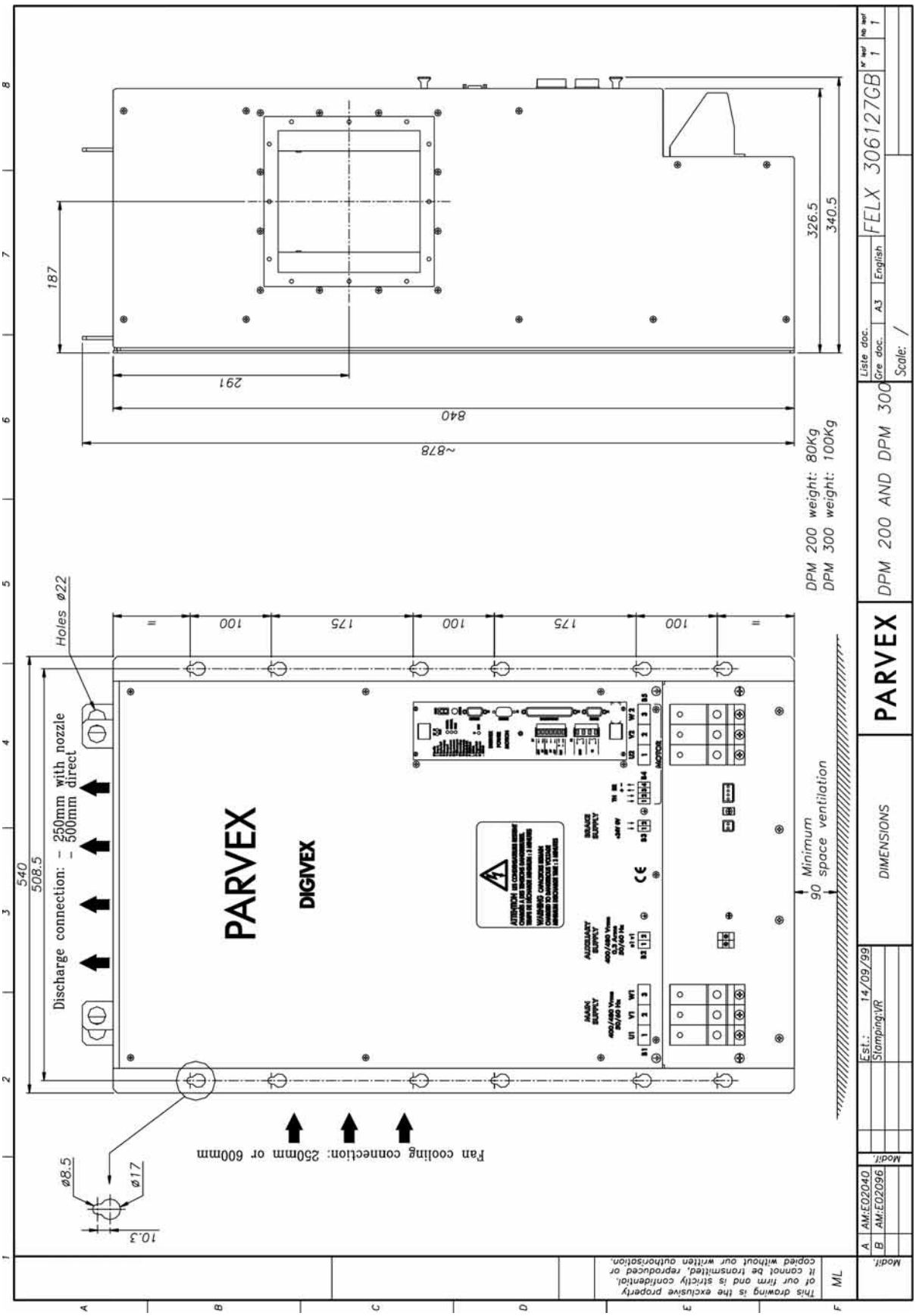
ML


PARVEX
DIGIVEX
DPM 200 AND DPM 300
DIMENSIONS
FELX 306127GB
DPM 200 weight: 80Kg
DPM 300 weight: 100Kg
Holes ø22
Discharge connection: - 250mm with nozzle
- 500mm direct
Fan cooling connection: 250mm or 600mm
Minimum space ventilation
540
508.5
326.5
340.5
187
291
840
~878
ø8.5
ø17
10.3
100
175
English
A3
14/09/99
Stamping:VR
AM:E02040
AM:E02096

4.2 Labeling and coding

Markings :

- **On DPM 50/80 (DIGIVEX Power Motion 50/80) :**
  - one front panel label as shown on model below

This label gives the electrical characteristics required by UL and c UL drive compliance.

PARVEX Made in France

AC SERVO

Part. number : **DPM27050**

LISTED POWER CONVERSION EQUIPMENT 1PD9

Serial Nr : 00250 Date : 07/03

	Input	Output
Voltage	400V +30% -10%	0 - 400V
Phase	3	3
Current	32A	31A
Freq.	47 - 63Hz	0 - 1,5kHz
Motor	16kW (1,3 Uout x Iout) / 20HP	
Classe 1	IP 20	Temperature : refer to user manual.

ATTENTION : Chocs Electriques
Les condensateurs restent chargés à des tensions dangereuses.
Temps de décharge minimum : 3 min.
Se référer à la notice d'utilisation.

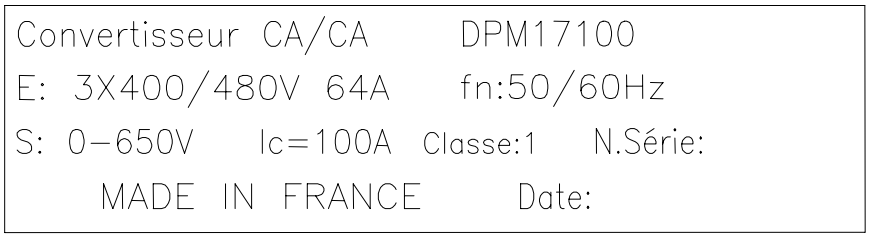
WARNING : Risk of Electric Shock
Capacitors remain charged to dangerous voltage.
Minimun discharge time : 3 min. Refer to user manual.

www.parvex.com
Fax : 33 (0) 3 80 42 41 19

Meaning of label indications :

- AC SERVO :	Alternating current converter
- DPM 27050	DPM50/80 servoamplifier code
- Serial Nr :	Servoamplifier serial number
- Date :	Manufacturing date
- Input :	Input characteristics
- Output :	Output characteristics
- Voltage :	RMS Voltage
- Phase :	Phase number
- Current :	RMS Current
- Freq.:	Fréquency in Hz
- Moteur :	Motor power in kW et in HP
- Classe :	Service class according to NF EN60146 standard, 1= permanent
- IP20 :	Protection indice according to NF EN 60529 standard

- **On DPM (DIGIVEX Power Motion) :**
  - one front panel label as in the model below :



Meaning of label markings :

- CA/CA converter alternating current / alternating current converter
- DPM----- DIGIVEX Power Motion servoamplifier code
- E: 3 x 400V --A Input voltage and current
- fn Frequency
- S: 0-55V --Â Output voltage and permanent output current (Amps. Peak)
- Classe Service class to standard NF EN60146, 1 = permanent
- Serial number and date of manufacture

- **On DPC (DIGIVEX Power Control) removable block (excluding DPM 50/80):**

Drive customization parameters are recorded in a plug-in EEPROM. They can only be read via a PC with PME DIGIVEX Motion software.

- **For DPM 50/80**

The cover of the drive must be removed to access the EEPROM located on the SP6606 card

Codes

Power supply 400/480V

CODE	FUNCTION
DPM27050-	DPM 50/80
DPM17100-	DPM 100/120
DPM17150-	DPM 150
DPM17200-	DPM 200
DPM17300-	DPM 300

For DPM 200 and DPM 300 devices the sales reference for compulsory fan-cooling can be found in 4.4.

DPMxxxxxC : DPM with fieldbus interface CANopen
DPMxxxxxP : DPM with fieldbus interface Profibus

4.3 Front panel, terminal blocks and SUB-D plugs

4.3.1 Description of terminal blocks and sockets

All the input/outputs required for operation are arranged on the front panel in the form of :

- B1 “MAIN SUPPLY”.
- B2 “AUXILIARY SUPPLY”
- B3 “BRAKE SUPPLY”.
- B4 auxiliary power supply terminal block.
- B5 terminal block for automatic control connection.
- B6 “READY” (Drive ready for connection to mains), “OK” (regulation and power OK)
- B7 “RESET”

Connectors with metal-plated or metallic covers.

ITEM REF.	CONNECTOR TYPE (cable end)	FUNCTION	MAX. CONDUCTOR CROSS-SECTION
X1 FIELDBUS	9-pin plug for soldering	Fieldbus connection	max. 0.5 mm² on soldering barrel
X2 INPUTS/ OUTPUTS	37-pin plug for soldering	Logic and analog inputs / output	max. 0.5 mm² on soldering barrel
X3 ENCODER	9-pin plug if encoder emulator output	Encoder emulation output (option)	max. 0.5 mm² on soldering barrel
	9-pin socket for soldering	Incremental encoder input (option)	
X4 RESOLVER	9-pin socket for soldering	Resolver link	max. 0.5 mm² on soldering barrel

- For the DPM 50/80:
The motor earth must be connected to the ground terminal.

- For the DPM 100/120, DPM 150, DPM 200 and DPM 300:
The motor earth must be connected to the Faston earth lug on the appliance. The SUB-D plugs used must be metal-coated (or metal) and provide continuous shielding through to the appliance's metal earth.

The equipment

- Receives the 230 V or 400V/480V mains supply through terminal block B1 and converts it into 550V dc voltage.
- Returns braking energy to the mains network (diode bridge + IGBT transistors).
- The single-phase 400V or 480V mains supply is fed into terminal block B2 to generate the auxiliary supplies (± 15V,± 12V pour les DPM 50/80, 5V, 24V) required for regulation.
- 24V supply for the motor brake may be fed into terminal block B3.
- Ensures interface with automatic control via terminal blocks B6 and B7.

4.3.2 Description of 7-segment display and LEDs

- A 7-segment "STATUS" display shows the drive operating status.
- A green "POWER ON" LED indicates the auxiliary supply and power supply are on.
- A "POWER OFF" red LED indicates there is no power supply.
- An "OVERVOLT." red LED indicates excess mains or bus voltage.
- A "PHASE" red LED indicates no mains phase (three-phase appliances only).
- An "OVER CUR" red LED indicates either excessive internal current in the power supply or a problem with the capacitor precharging circuit (load current limiting resistor cut out or internal contactor damaged).

4.3.3 Rotary mini-switch setting (ADDRESS)

Each appliance in the same network CAN or Profibus must have a different subscriber number.

A rotating, 16-position, mini-switch is used to define the number of the appliance.

For information:

0	Prohibited
1	1*
2	2*
3	3
. . . .	. . . .
A	10
B	11
C	12
D	13
E	14
F	15

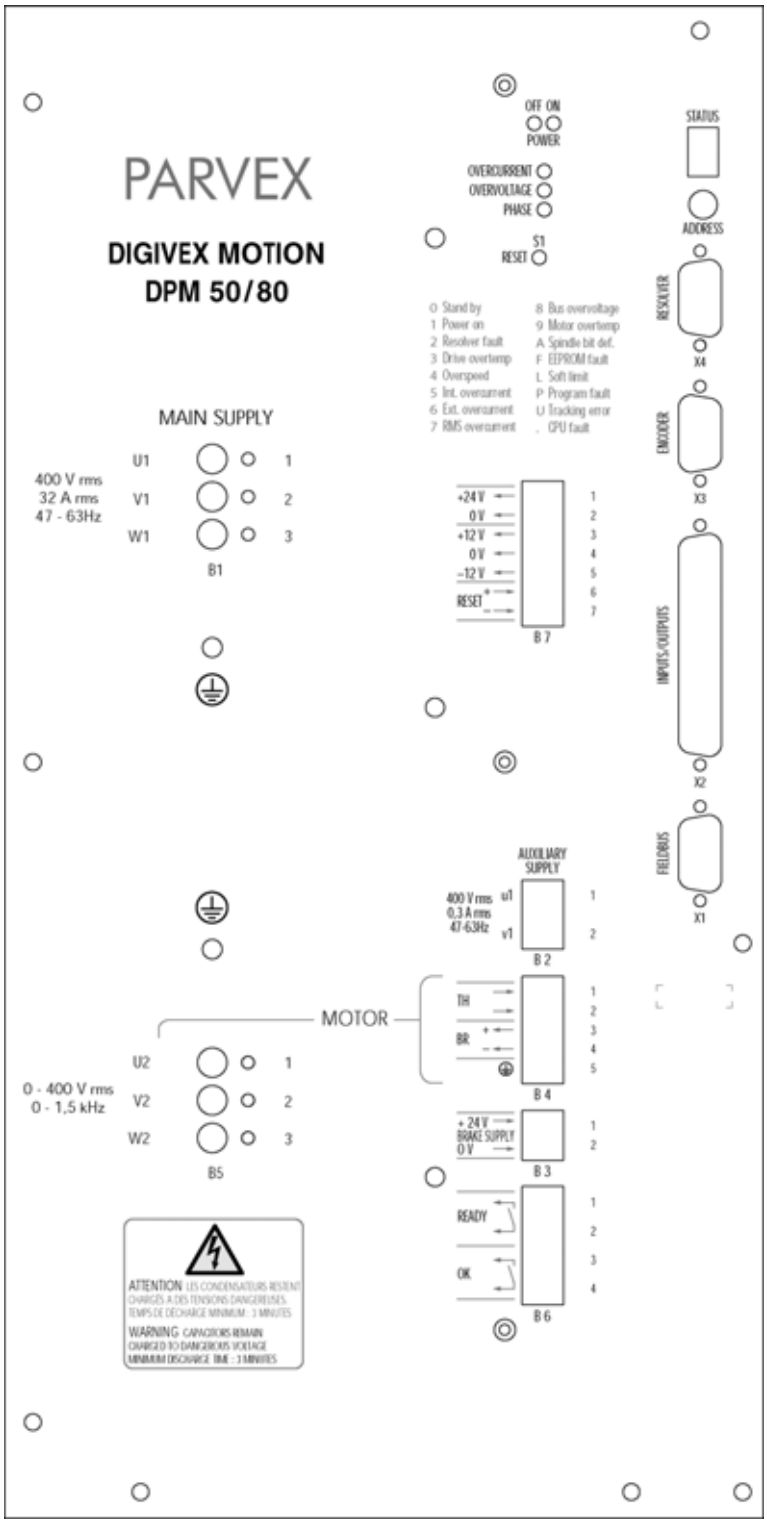
* The “1” and “2” addresses are prohibited to the Profibus bus

The subscriber code may be extended. Please ask for details.

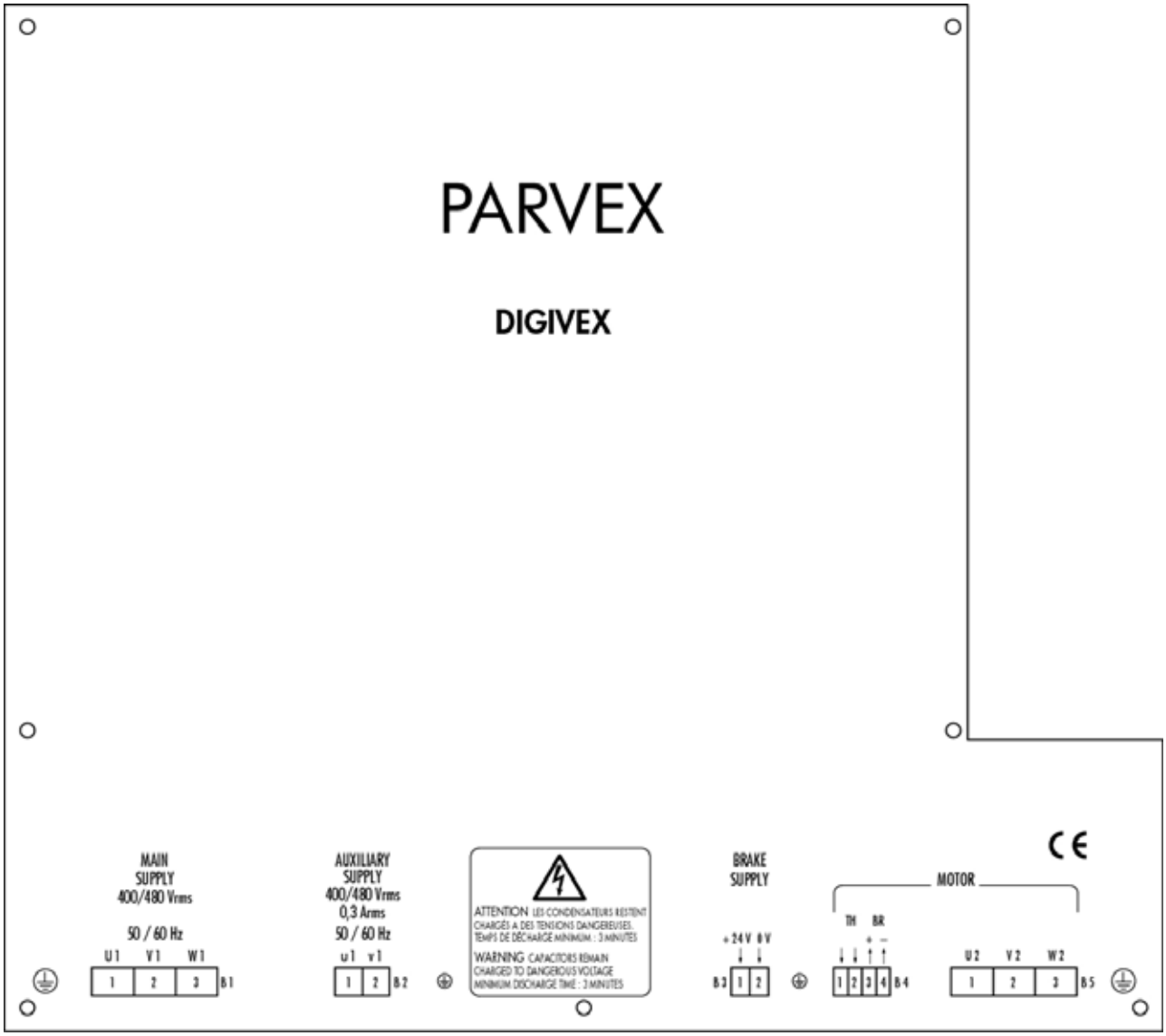
Attention! For a subscriber number change to be acknowledged, the appliance must be switched off completely for a few seconds.

4.3.4 Diagrams

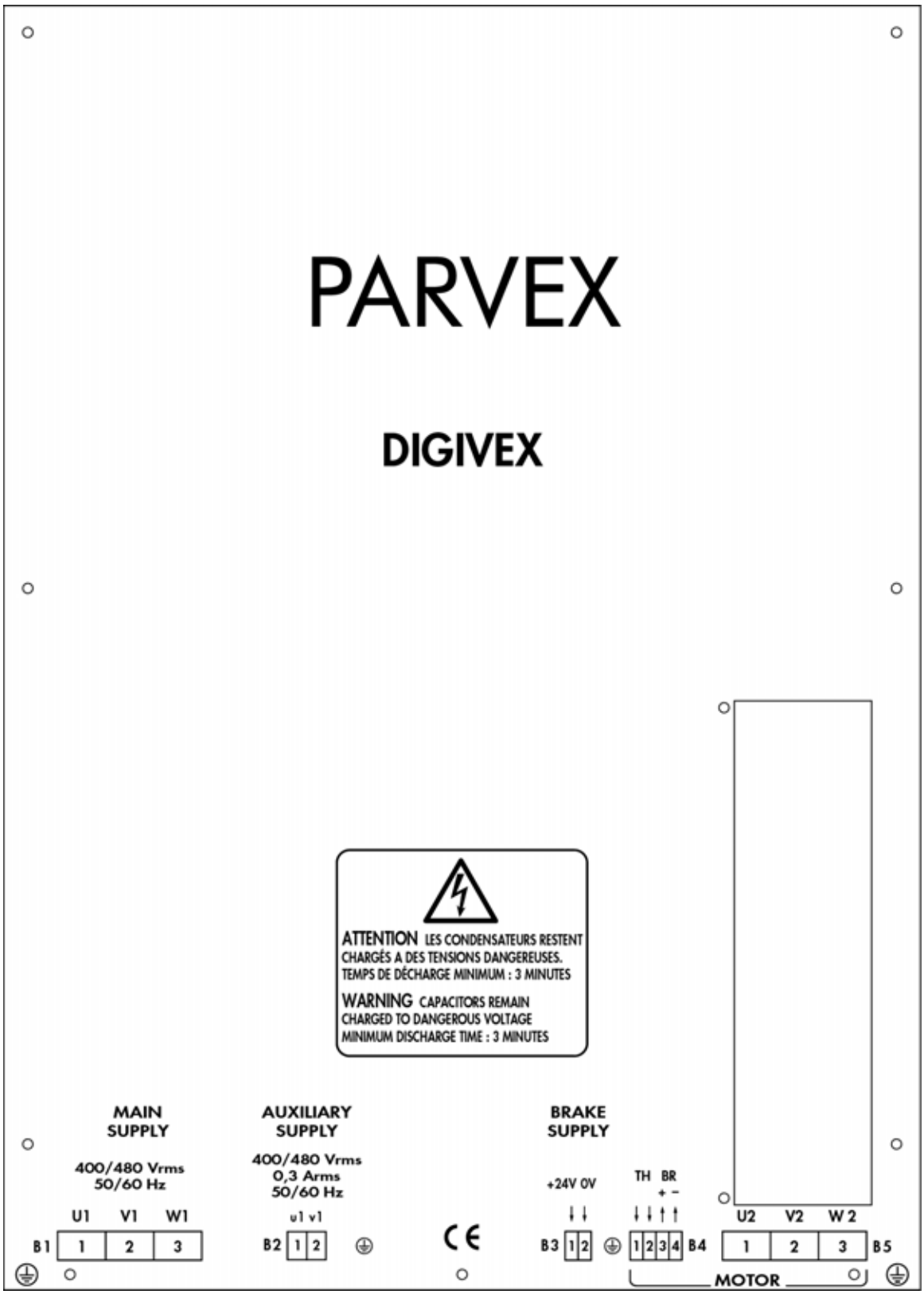
Front panel DPM 50/80



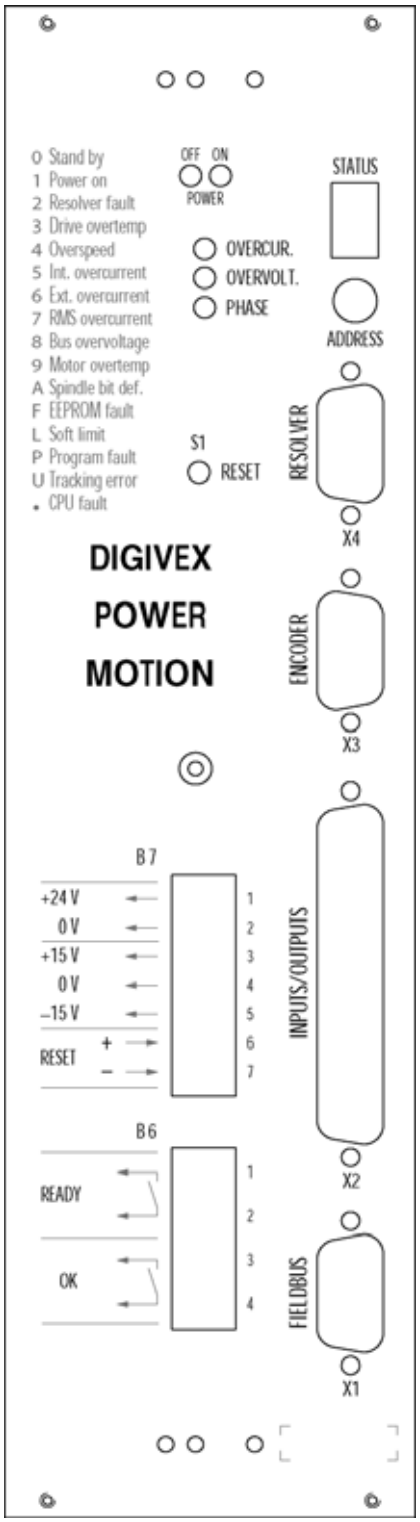
Front panel DPM 100/120 and DPM 150


PARVEX
DIGIVEX
MAIN SUPPLY 400/480 Vrms
50 / 60 Hz
U1 V1 W1
1 2 3 B1
AUXILIARY SUPPLY 400/480 Vrms 0,3 Arms 50 / 60 Hz
u1 v1
1 2 B2
ATTENTION LES CONDENSATEURS RESTENT CHARGÉS A DES TENSIONS DANGEREUSES. TEMPS DE DÉCHARGE MINIMUM : 3 MINUTES
WARNING CAPACITORS REMAIN CHARGED TO DANGEROUS VOLTAGE MINIMUM DISCHARGE TIME : 3 MINUTES
BRAKE SUPPLY
+ 24 V 0 V
B3 1 2
MOTOR
TH BR
1 2 3 4 B4
U2 V2 W2
1 2 3 B5
CE

Front panel DPM 200 and DPM 300


PARVEX
DIGIVEX
ATTENTION LES CONDENSATEURS RESTENT CHARGÉS A DES TENSIONS DANGEREUSES. TEMPS DE DÉCHARGE MINIMUM : 3 MINUTES
WARNING CAPACITORS REMAIN CHARGED TO DANGEROUS VOLTAGE MINIMUM DISCHARGE TIME : 3 MINUTES
MAIN SUPPLY
400/480 Vrms 50/60 Hz
U1 V1 W1
B1 1 2 3
AUXILIARY SUPPLY
400/480 Vrms 0,3 Arms 50/60 Hz
u1 v1
B2 1 2
BRAKE SUPPLY
+24V 0V
B3 1 2
TH BR + −
1 2 3 4 B4
U2 V2 W 2
1 2 3 B5
MOTOR

Front panel Mobile block
For DPM 100/120, DPM 150, DPM 200 and DPM 300



4.4 Accessories

4.4.1 Input mains filter

- For DPM 50/80: FR 03636
- For DPM 100/120: FR 03064
- For DPM 150: FR 03100
- For DPM 200: FR 03200
- For DPM 300: FR 03200

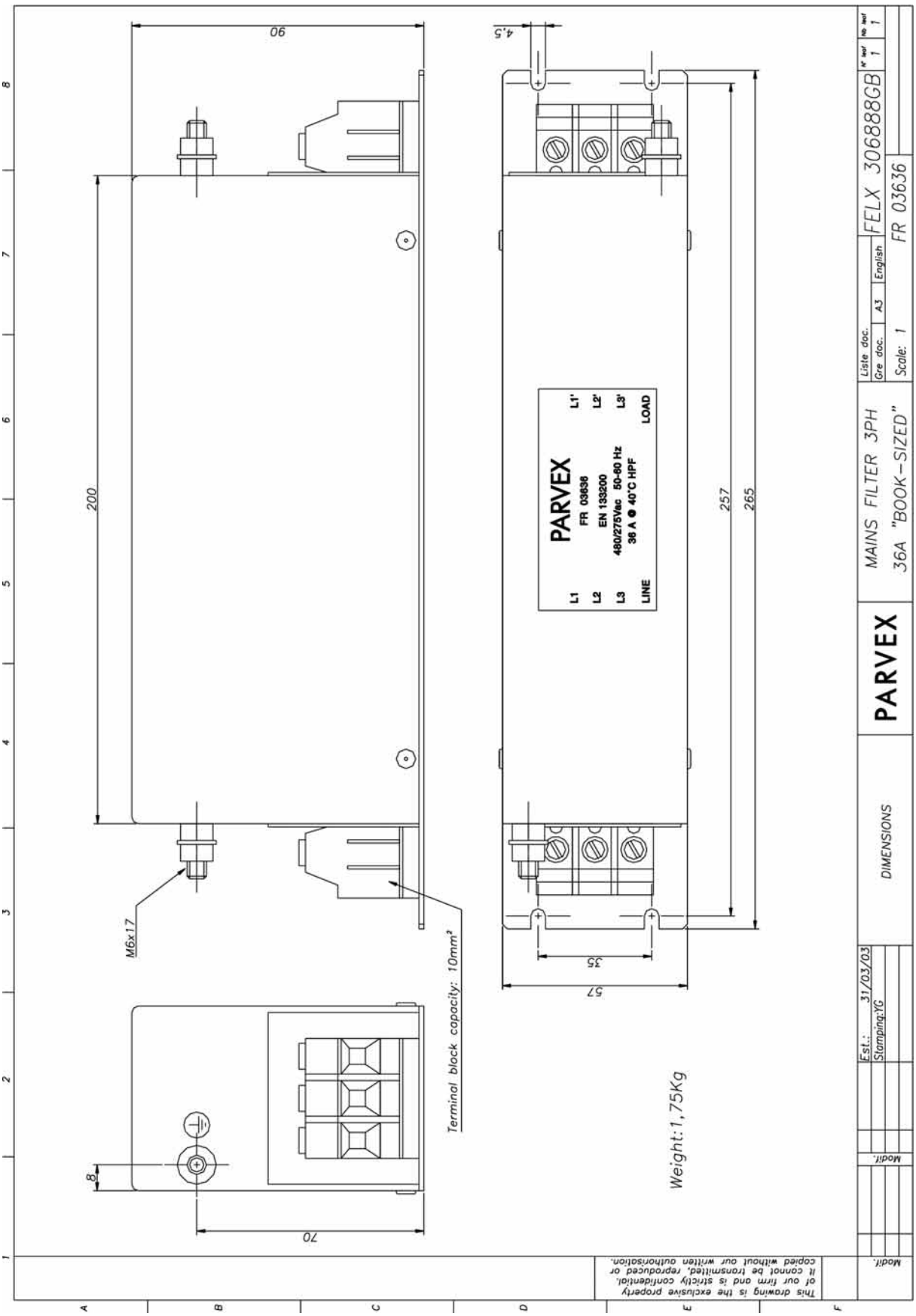
Dimensions as in drawing FELX 304967 and 305452 (see next pages).

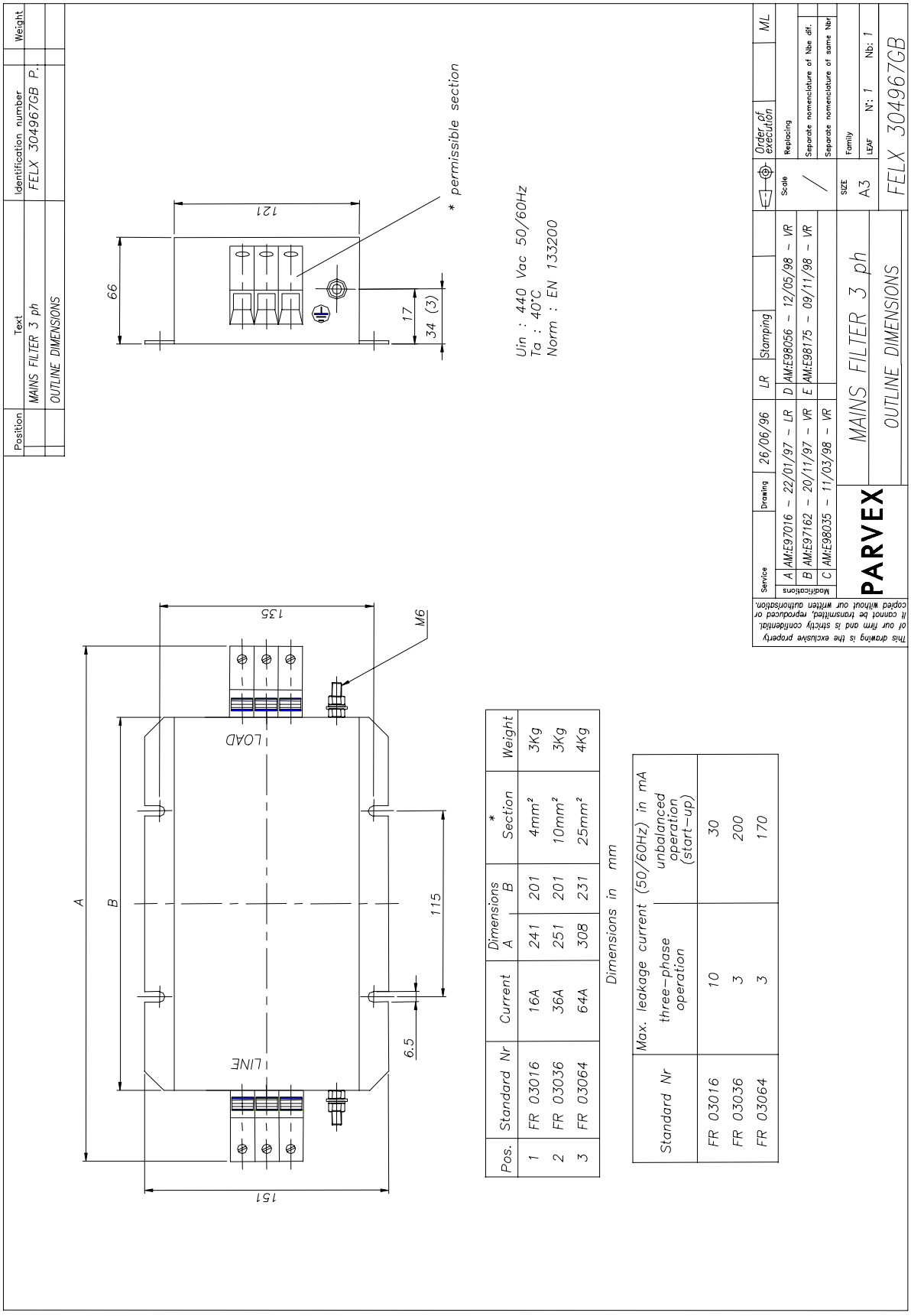
4.4.2 Inductors for long cables

Inductances for long cables between motor and servoamplifier. Selection, see §5.8.6 Dimensions, see drawing FELX 302983 (next pages).

- **Ventilation**

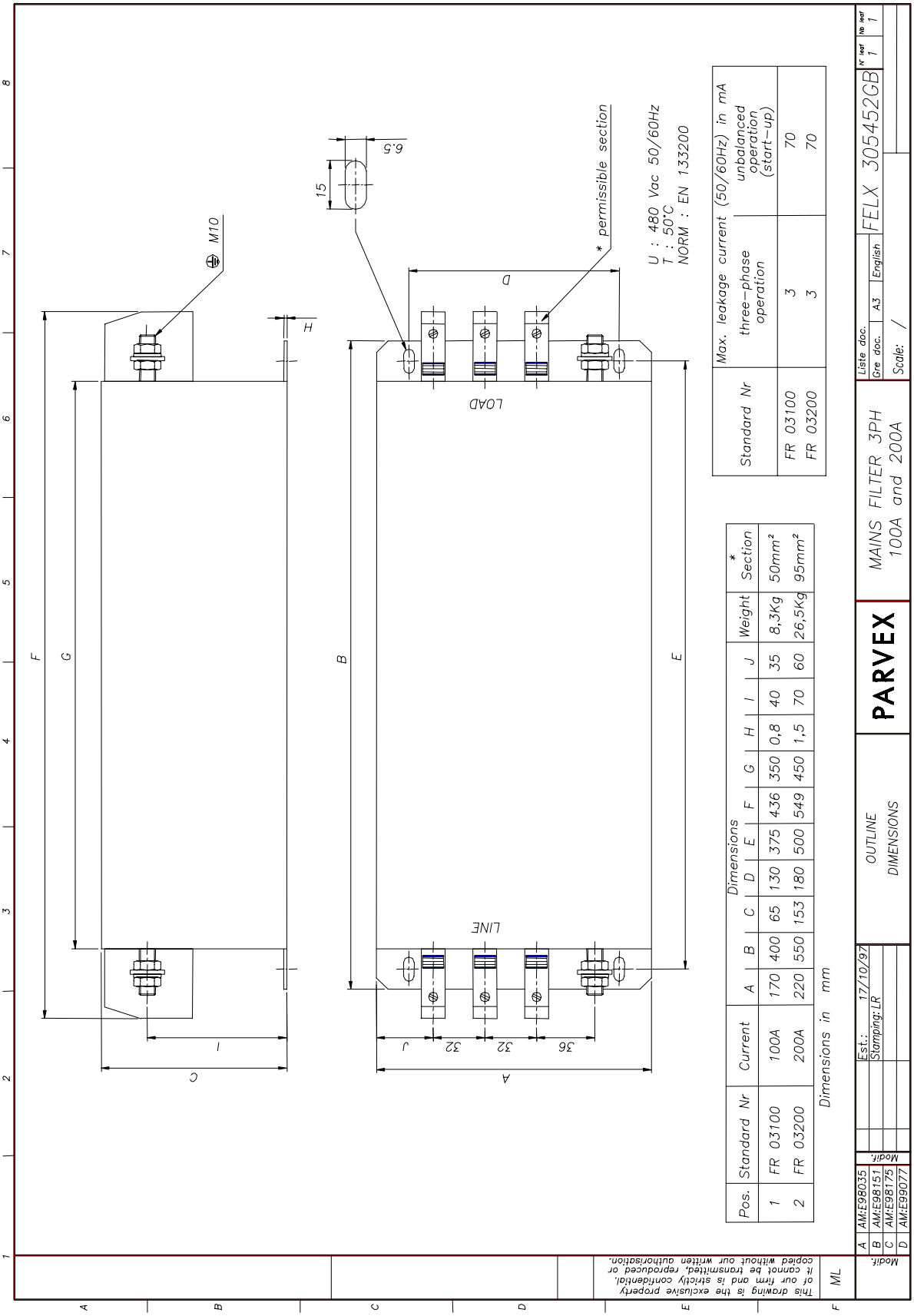
CODE	FUNCTION
DPD/IS	DPM300/200 - Straight inlet
DPD/I90	DPM300/200 - Elbowed inlet
DPD/OS	DPM300/200 - Straight outlet
DPD/FOS	DPM300/200 - Straight fan outlet
DPD/FO90	DPM300/200 - Elbowed fan outlet
VN 10001	DPM300/200 - 400V 50Hz fan and 480V 60Hz fan
VN 02004	DPM300/200 - Hose
VN 02006	DPM300/200 - Protective mesh

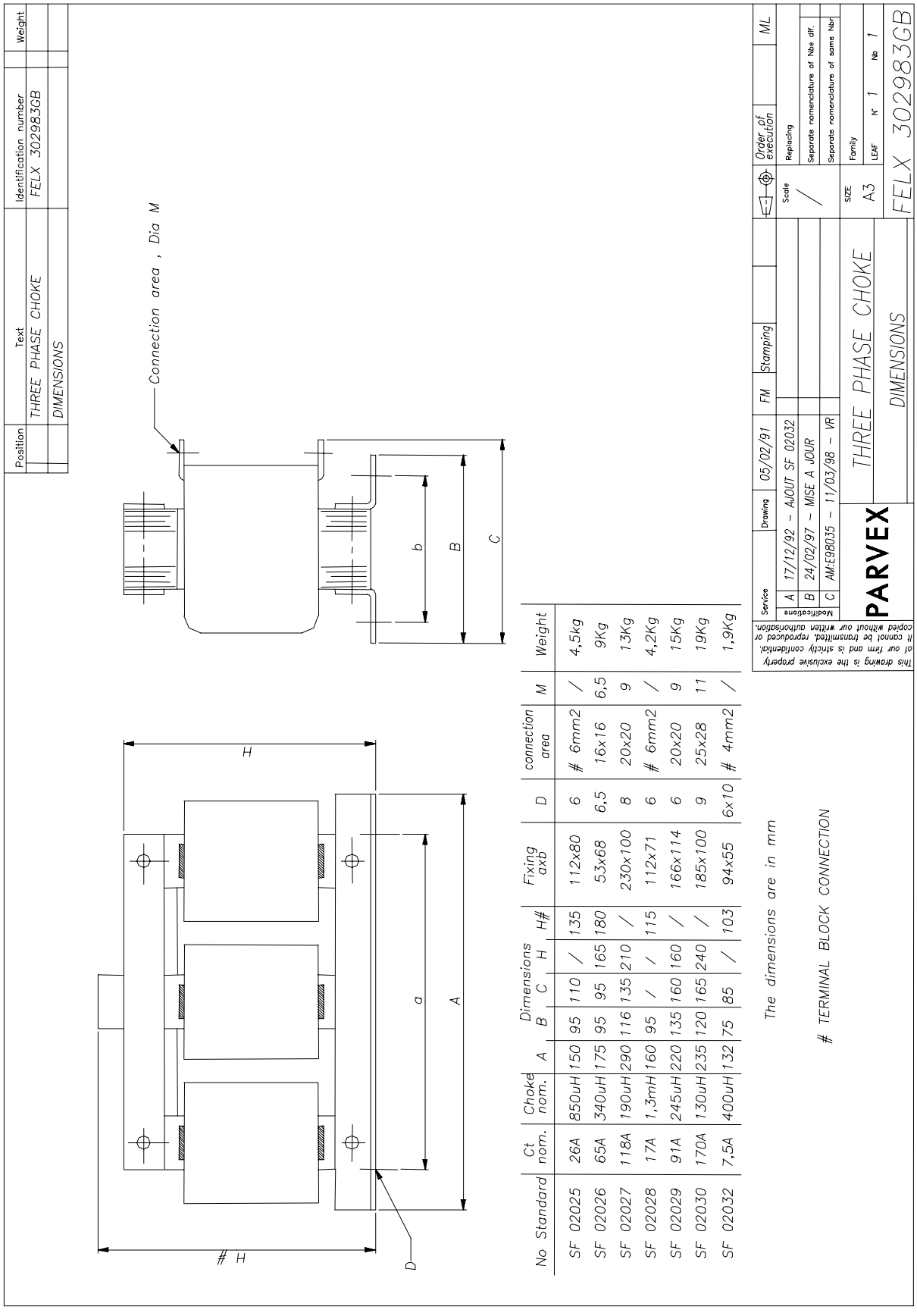

90
4,5
200
257
265
PARVEX
FR 03636
EN 133200
480/275Vac 50-60 Hz
36 A @ 40°C HPF
L1
L2
L3
LINE
L1'
L2'
L3'
LOAD
M6x17
Terminal block capacity: 10mm²
35
57
70
8
Weight: 1,75Kg
DIMENSIONS
PARVEX
MAINS FILTER 3PH
36A "BOOK-SIZED"
FELX 306888GB
FR 03636
Scale: 1
English
A3
31/03/03
Stamping:YG
This drawing is the exclusive property of our firm and is strictly confidential. It cannot be transmitted, reproduced or copied without our written authorisation.



Pos.	Standard Nr	Current	Dimensions A	Dimensions B	* Section	Weight
1	FR 03016	16A	241	201	4mm²	3Kg
2	FR 03036	36A	251	201	10mm²	3Kg
3	FR 03064	64A	308	231	25mm²	4Kg

Standard Nr	Max. leakage current (50/60Hz) in mA three-phase operation	unbalanced operation (start-up)
FR 03016	10	30
FR 03036	3	200
FR 03064	3	170

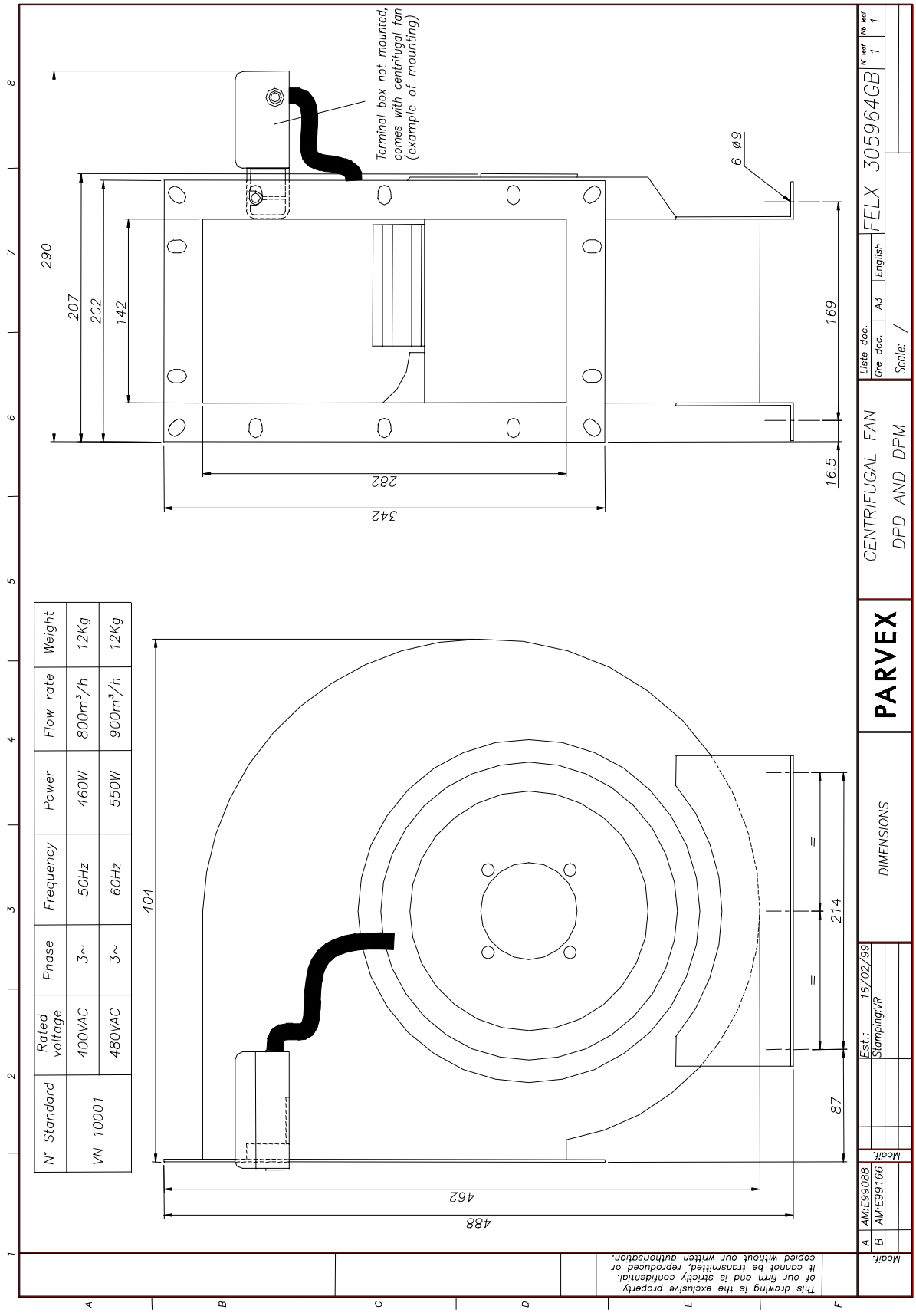

M10
H
F
G
C
I
B
E
A
J
32
32
36
LINE
LOAD
D
* permissible section
15
6.5
U : 480 Vac 50/60Hz
T : 50°C
NORM : EN 133200
Standard Nr
Max. leakage current (50/60Hz) in mA
three-phase operation
unbalanced operation (start-up)
FR 03100
FR 03200
3
3
70
70
Pos.
Standard Nr
Current
Dimensions
A
B
C
D
E
F
G
H
I
J
Weight
* Section
1
FR 03100
100A
170
400
65
130
375
436
350
0,8
40
35
8,3Kg
50mm²
2
FR 03200
200A
220
550
153
180
500
549
450
1,5
70
60
26,5Kg
95mm²
Dimensions in mm
PARVEX
MAINS FILTER 3PH
100A and 200A
OUTLINE
DIMENSIONS
FELX 305452GB
Est.: 17/10/97
Stamping: LR
Modif.
A AM:E98035
B AM:E98151
C AM:E98175
D AM:E99077
Liste doc.
Gre doc.
A3
English
Scale: /
This drawing is the exclusive property of our firm and is strictly confidential. It cannot be transmitted, reproduced or copied without our written authorisation.
ML



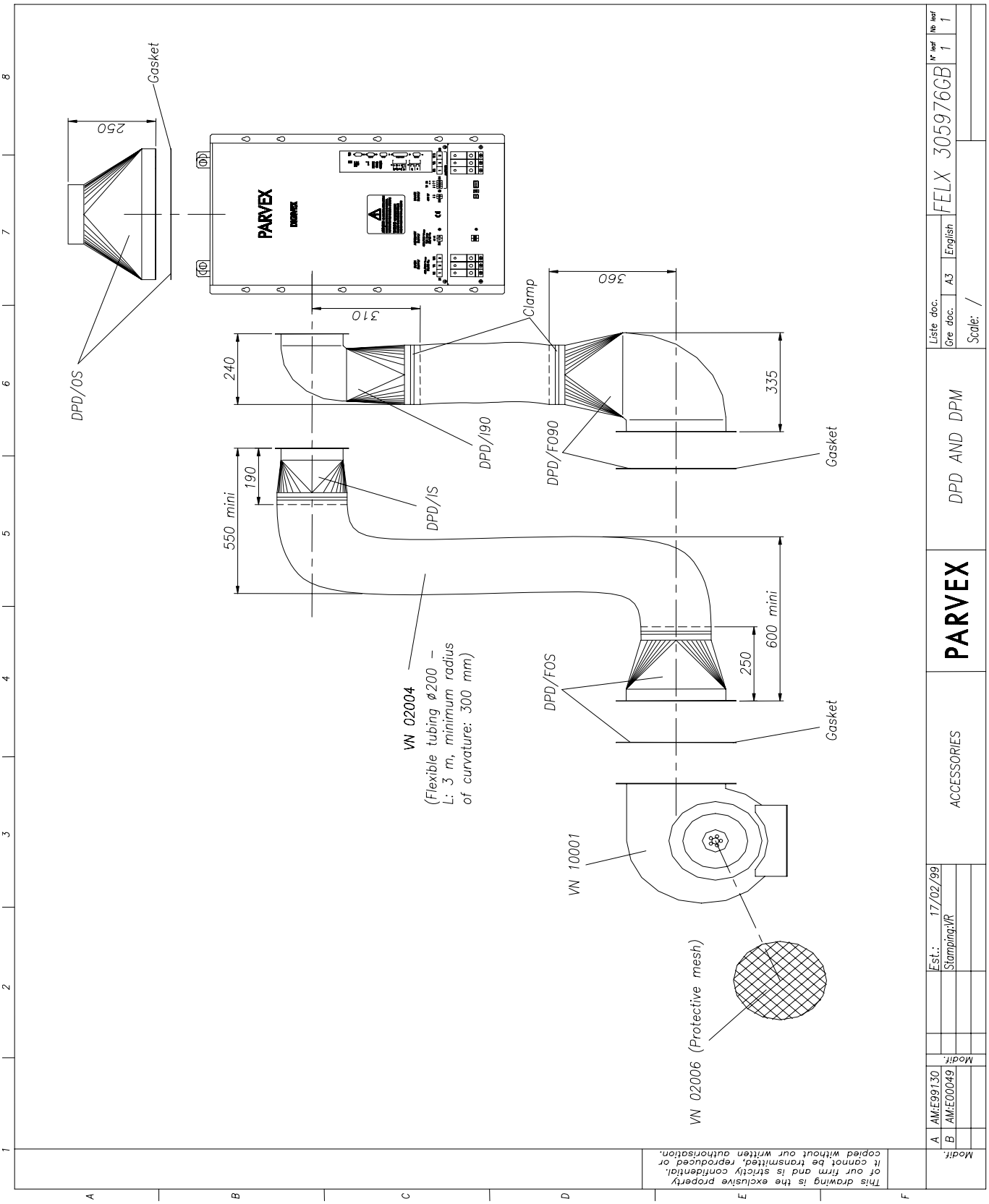
No	Standard	Ct nom.	Choke nom.	Dimensions A	B	C	H	H#	Fixing axb	D	connection area	M	Weight
SF	02025	26A	850uH	150	95	110	/	135	112x80	6	# 6mm2	/	4,5kg
SF	02026	65A	340uH	175	95	95	165	180	53x68	6,5	16x16	6,5	9Kg
SF	02027	118A	190uH	290	116	135	210	/	230x100	8	20x20	9	13Kg
SF	02028	17A	1,3mH	160	95	/	/	115	112x71	6	# 6mm2	/	4,2Kg
SF	02029	91A	245uH	220	135	160	160	/	166x114	6	20x20	9	15Kg
SF	02030	170A	130uH	235	120	165	240	/	185x100	9	25x28	11	19Kg
SF	02032	7,5A	400uH	132	75	85	/	103	94x55	6x10	# 4mm2	/	1,9Kg

The dimensions are in mm

TERMINAL BLOCK CONNECTION



N° Standard	Rated voltage	Phase	Frequency	Power	Flow rate	Weight
VN 10001	400VAC	3~	50Hz	460W	800m³/h	12Kg
	480VAC	3~	60Hz	550W	900m³/h	12Kg


Gasket
250
DPD/OS
PARVEX
310
Clamp
360
240
335
DPD/190
DPD/F090
Gasket
550 mini
190
DPD/IS
VN 02004
(Flexible tubing ø200 –
L: 3 m, minimum radius
of curvature: 300 mm)
DPD/FOS
250
600 mini
Gasket
VN 10001
VN 02006 (Protective mesh)
This drawing is the exclusive property of our firm and is strictly confidential. It cannot be transmitted, reproduced or copied without our written authorisation.
Modif.
A AM-E99130
B AM-E00049
Est.: 17/02/99
Stamping:VR
ACCESSORIES
PARVEX
DPD AND DPM
Liste doc.
Gre doc. A3 English
Scale: /
FELX 305976GB
N° leaf 1
Nb leaf 1

5. ELECTRICAL CONNECTIONS

5.1 General Wiring Requirements

5.1.1 Appliance handling

See the safety instructions given at the beginning of this manual. In particular, wait for all the front panel LEDs to go off completely before doing any work on the servo-amplifier or servomotor.

5.1.2 Electromagnetic compatibility

EARTHING

- Comply with all local safety regulations concerning earthing.
- Utilize a metal surface as an earth reference plane (e.g. cabinet wall or assembly grid). This conducting surface is termed the potential reference plate. All the equipment of an electrical drive system is connected up to this potential reference plate by a low impedance (or short distance) link. Ensure the connections provide good electrical conduction by scraping off any surface paint and using fan washers. The drive will then be earthed via a low impedance link between the potential reference plate and the earth screw at the back of the DPM. If this link exceeds 30 cm, a flat braid should be used instead of a conventional lead.

CONNECTIONS

- Do not run low-level cables (resolver, inputs/outputs, NC or PC links) alongside what are termed power cables (power supply or motor). Do not run the power supply cable and the motor cables alongside one another otherwise mains filter attenuation will be lost. These cables should be spaced at least 10 cm apart and should never cross, or only at right-angles.
- Except for the resolver signals, all low-level signals will be shielded with the shielding connected at both ends. At the DPM end, the shielding is made continuous by the Sub-D connector mechanism.
- The motor cables are limited to the minimum functional length. The yellow and green motor cable lead must be connected to the box or front panel terminal block with the shortest possible link.
- This usually means shielded motor cable is not required. Chokes may also be inserted into the motor phase leads.

MAINS FILTERING

The equipment complies with standard EN55011 with a filter on the power input with minimum 60dB attenuation in the 150 kHz - 30 MHz range.

The network filter must be fitted to the ground reference plane (TRP) at the mains end, ahead of the KM contactor and as close as possible to the DIGIVEX Power Motion.
A shielded power cable or a cable in a metal jacket must be used between the DIGIVEX Power Motion and the KM contactor as well as between the KM contactor and the filter.
Avoid running cables together ahead of and after the filter.

Do not connect other appliances in parallel with the DIGIVEX after the KM.

The filtre+drive+motor unit sometimes has high leakage currents which can give rise to the tripping of the ground fault circuit breaker. The ground fault circuit protection must have a minimum threshold of 300mA. We recommend the use of delayed ground fault circuit breakers.

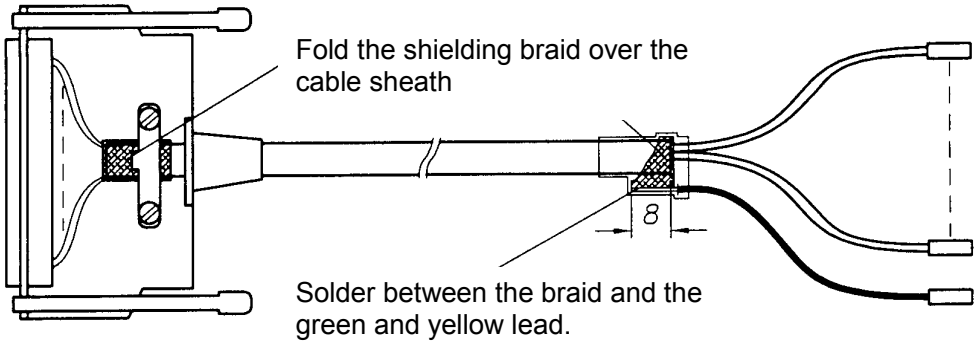
OTHER MEASURES

Self-inducting components must be protected against interference: brakes, contactor or relay coils, fans, electro-magnets, etc.

5.1.3 DIGIVEX Power Motion Sub-D connectors

In order to ensure the system is free from disturbances, it is essential for the rack to be properly connected to the earth plane of the electrical cabinet and for the covers of the Sub-D connectors to be EMI/RFI shielded (metal with shielding braid connection).
Make sure the Sub-D connectors and their covers are properly connected (lock screws fully tight).

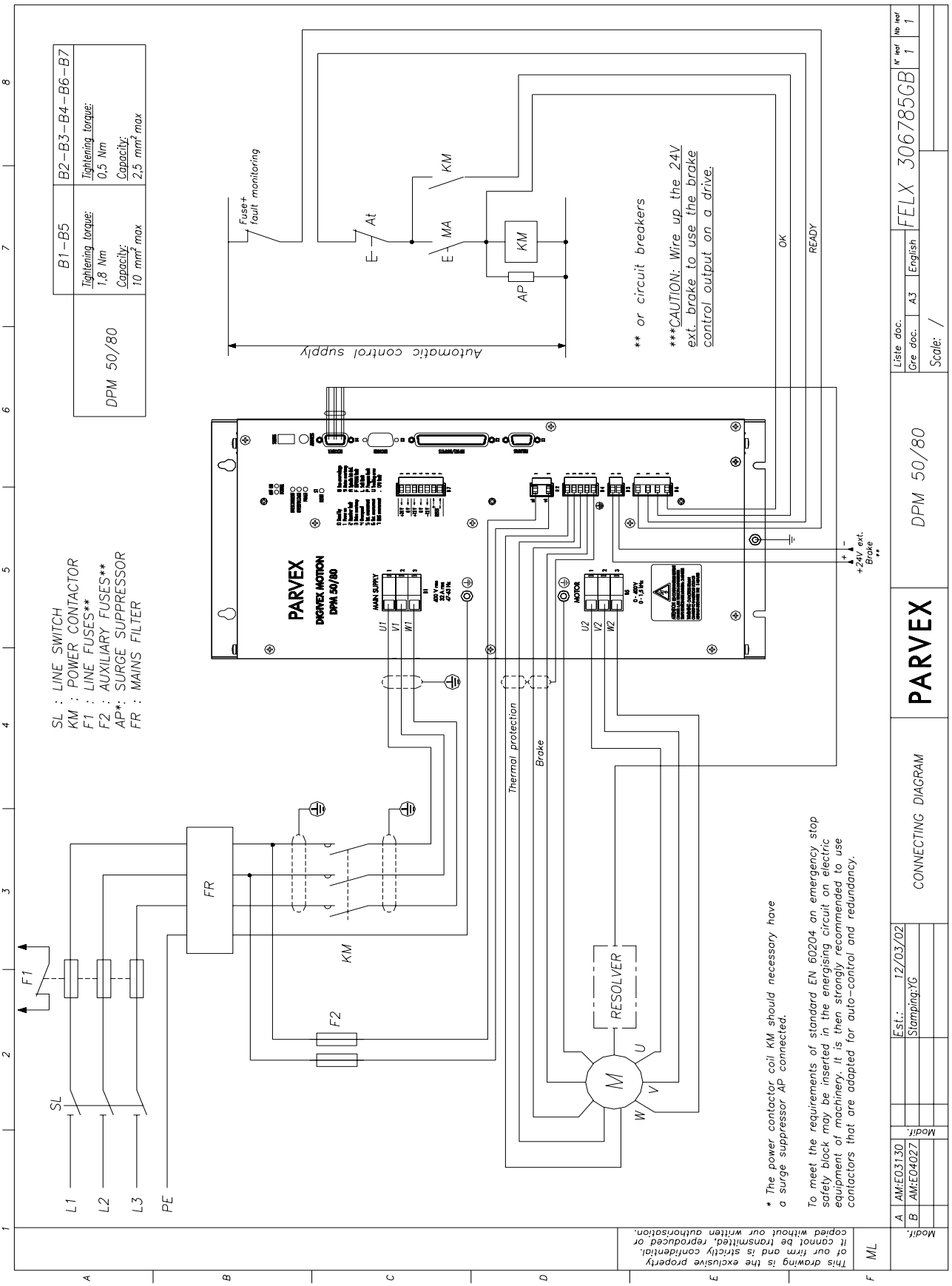
GROUND CONNECTION

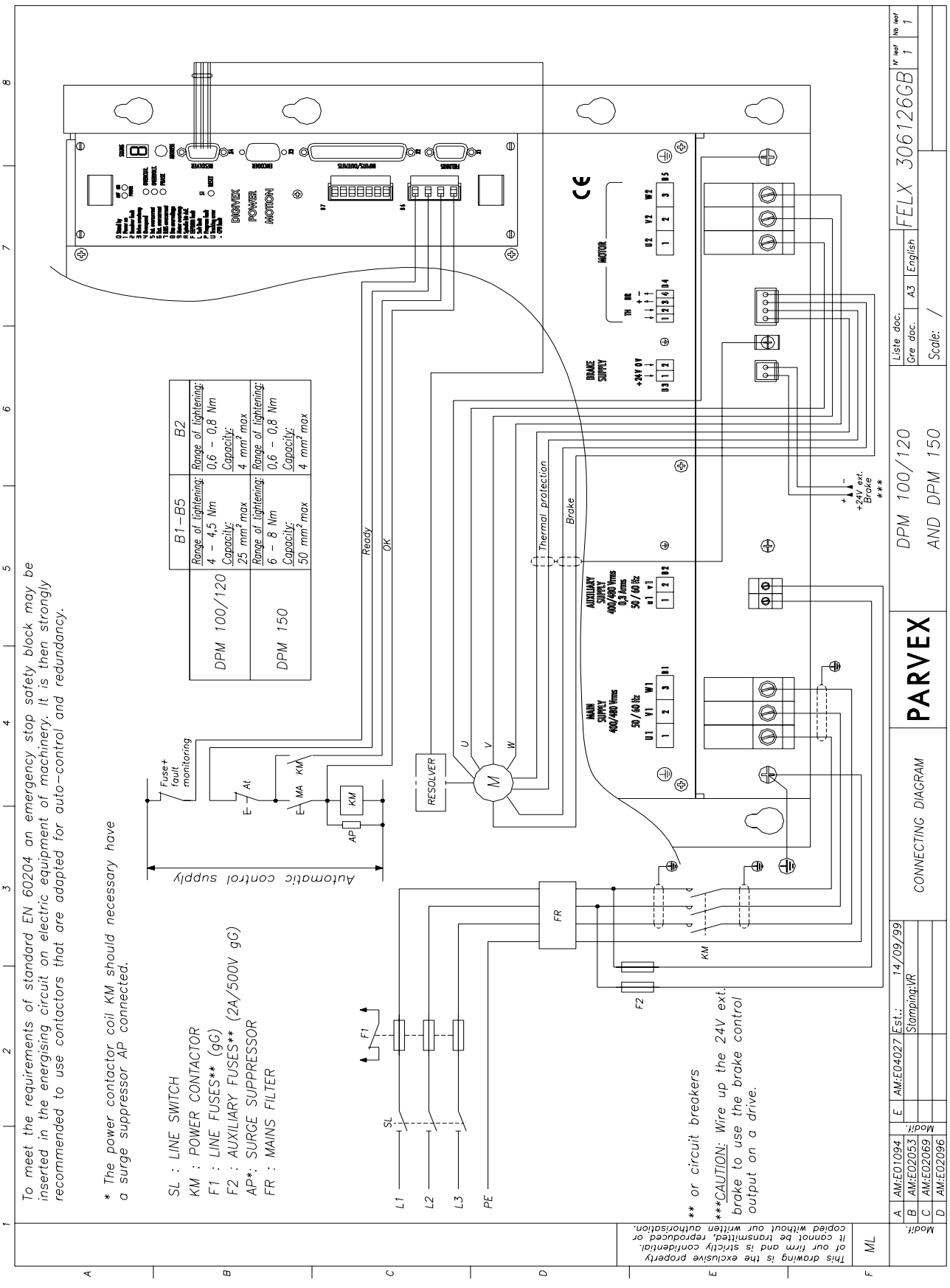


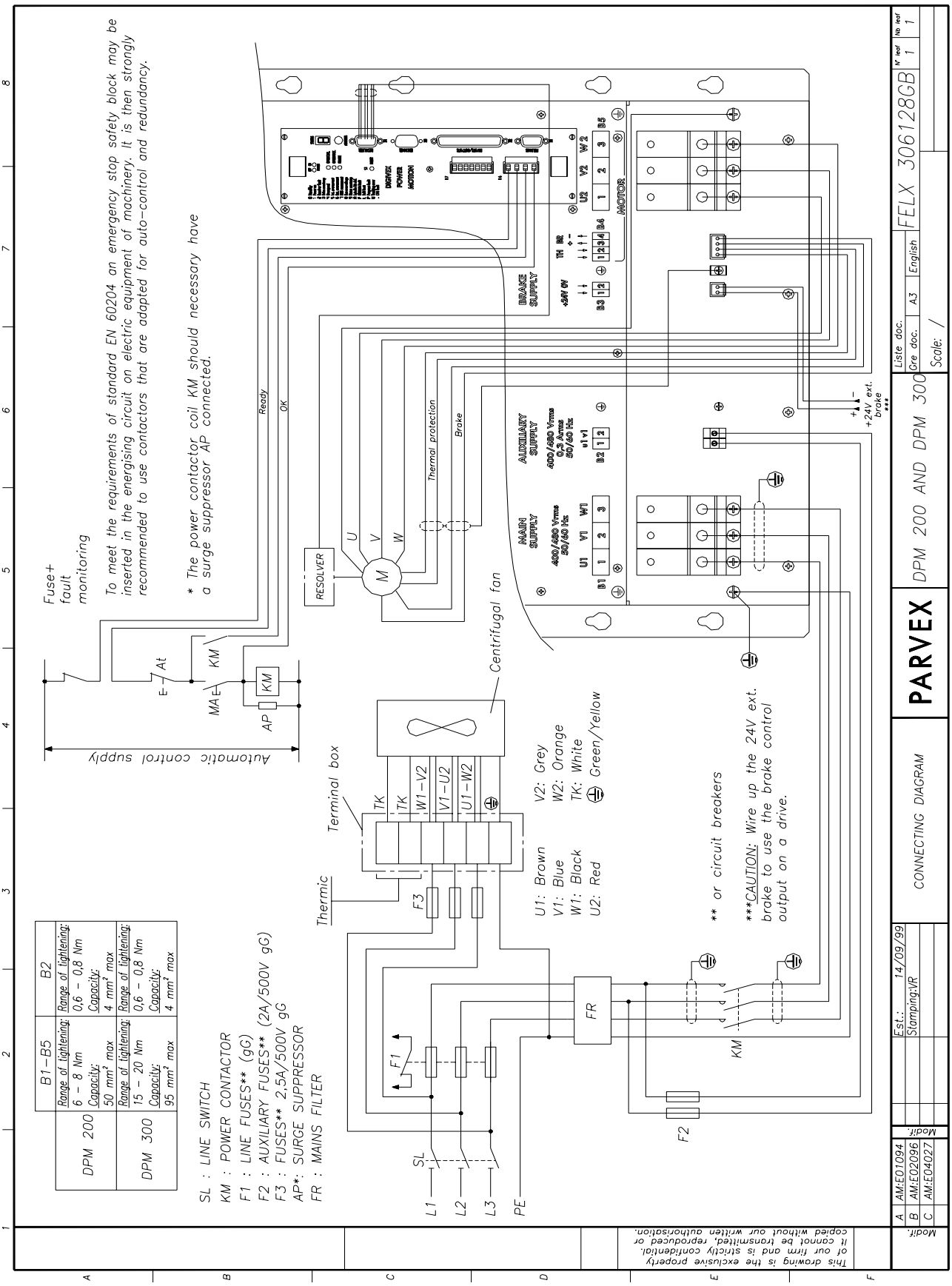
5.2 Typical Connection Diagram

See drawing FELX306785, FELX306126 and 306128.

It is mandatory to connect the auxiliary power supply to check the condition of the variable speed control before power is applied.
The automatic control diagram must be complied with in full.


B1-B5
Tightening torque: 1,8 Nm
Capacity: 10 mm² max
B2-B3-B4-B6-B7
Tightening torque: 0,5 Nm
Capacity: 2,5 mm² max
DPM 50/80
SL : LINE SWITCH
KM : POWER CONTACTOR
F1 : LINE FUSES**
F2 : AUXILIARY FUSES**
AP*: SURGE SUPPRESSOR
FR : MAINS FILTER
L1
L2
L3
PE
SL
F1
FR
KM
F2
RESOLVER
M
U
V
W
Thermal protection
Brake
PARVEX
DIGIVEX MOTION
DPM 50/80
U1
V1
W1
U2
V2
W2
+24V ext. Brake
Automatic control supply
Fuse+ fault monitoring
At
MA
KM
AP
** or circuit breakers
***CAUTION: Wire up the 24V ext. brake to use the brake control output on a drive.
OK
READY
* The power contactor coil KM should necessary have a surge suppressor AP connected.
To meet the requirements of standard EN 60204 an emergency stop safety block may be inserted in the energising circuit an electric equipment of machinery. It is then strongly recommended to use contactors that are adapted for auto-control and redundancy.
PARVEX
CONNECTING DIAGRAM
DPM 50/80
FELX 3067856B
Liste doc.
Gre doc.
A3
English
Scale: /
Modif.
A AM:E03130
B AM:E04027
Est.: 12/03/02
Stamping:YG
This drawing is the exclusive property of our firm and is strictly confidential. It cannot be transmitted, reproduced or copied without our written authorisation.
ML


To meet the requirements of standard EN 60204 on emergency stop safety block may be inserted in the energising circuit on electric equipment of machinery. It is then strongly recommended to use contactors that are adapted for auto-control and redundancy.
* The power contactor coil KM should necessary have a surge suppressor AP connected.
SL : LINE SWITCH
KM : POWER CONTACTOR
F1 : LINE FUSES** (gG)
F2 : AUXILIARY FUSES** (2A/500V gG)
AP*: SURGE SUPPRESSOR
FR : MAINS FILTER
** or circuit breakers
***CAUTION: Wire up the 24V ext. brake to use the brake control output on a drive.
B1-B5
Range of tightening: 4 - 4,5 Nm
Capacity: 25 mm² max
Range of tightening: 6 - 8 Nm
Capacity: 50 mm² max
B2
Range of tightening: 0,6 - 0,8 Nm
Capacity: 4 mm² max
Range of tightening: 0,6 - 0,8 Nm
Capacity: 4 mm² max
DPM 100/120
DPM 150
Automatic control supply
Fuse+ fault monitoring
RESOLVER
Ready
OK
Thermal protection
Brake
+24V ext. Brake ***
DPM 100/120
AND DPM 150
PARVEX
CONNECTING DIAGRAM
FELX 306126GB
Liste doc.
Gre doc.
A3
English
Scale: /
This drawing is the exclusive property of our firm and is strictly confidential. It cannot be transmitted, reproduced or copied without our written authorisation.
Modif.
A AM:E01094
B AM:E02053
C AM:E02069
D AM:E02096
E AM:E04027 Est.: 14/09/99 Stamping:VR


CONNECTING DIAGRAM
PARVEX
DPM 200 AND DPM 300
FELX 306128GB
Fuse+ fault monitoring
To meet the requirements of standard EN 60204 an emergency stop safety block may be inserted in the energising circuit on electric equipment of machinery. It is then strongly recommended to use contactors that are adapted for auto-control and redundancy.
* The power contactor coil KM should necessary have a surge suppressor AP connected.
Automatic control supply
Ready
OK
Thermal protection
Brake
RESOLVER
Centrifugal fan
Terminal box
Thermic
SL
KM
FR
F1
F2
F3
L1
L2
L3
PE
U1: Brown
V1: Blue
W1: Black
U2: Red
V2: Grey
W2: Orange
TK: White
Green/Yellow
** or circuit breakers
***CAUTION: Wire up the 24V ext. brake to use the brake control output on a drive.
SL : LINE SWITCH
KM : POWER CONTACTOR
F1 : LINE FUSES** (gG)
F2 : AUXILIARY FUSES** (2A/500V gG)
F3 : FUSES** 2,5A/500V gG
AP*: SURGE SUPPRESSOR
FR : MAINS FILTER
DPM 200
DPM 300
B1-B5
B2
Range of tightening: 6 - 8 Nm
Capacity: 50 mm² max
Range of tightening: 0,6 - 0,8 Nm
Capacity: 4 mm² max
Range of tightening: 15 - 20 Nm
Capacity: 95 mm² max
Range of tightening: 0,6 - 0,8 Nm
Capacity: 4 mm² max
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5.2.1 Surge Suppressor

- KM: Power Contactor
- AP: Surge Suppressor

The power contactor coil KM should **necessary** have a surge suppressor AP connected in order not to destroy prematurely the internal relay contact of the drive. This module should be use whether the power contactor supply is AC or DC.

The relay manufacturers (Telemecanique: LC1 series, ABB: B series,…) provide surge suppressors fitted relays wether the power contactor supply is AC or DC for various voltages (RC module, Diode+Zener Diode, Varistor,…).

5.3 Power component dimensioning

The installed power is :

P ~= 1.1 U rms x I_0 motor

where I_0 = permanent current at low speed

	Maximum I_0	Recommended fuses		Input filter
DPM 50/80	50 A	gG 32	AJT 40 (*)	FR 03636
DPM 100/120	100 A	gG 63		FR 03064
DPM 150/150	150 A	gG 100		FR 03100
DPM 200	200 A	gG 125		FR 03200
DPM 300	300A	gG 200		FR 03200

May be replaced by circuit breakers.
(*): UL and c UL compliance required: UL fuse 40A/600V JDDZ

5.4 MAIN SUPPLY Connection (Terminal block B1)

MARKING	TERMINAL	FRONT PANEL	FUNCTION	TERMINAL BLOCK TYPE	TERMINAL CAPACITY
B1/1 B1/2 B1/3	U1 V1 W1	MAINS SUPPLY	Connection To Mains	fixed, screw-type	**DPM 50** max 10 mm² flexible max 16 mm² rigid **DPM 100** max 25 mm² flexible max 35 mm² rigid **DPM 150 and DPM 200** max 50 mm² flexible max 50 mm² rigid **DPM 300** 35 mm² rigide 95 mm² maxi

5.5 Auxiliary supply Connection (Terminal block B2)

The supply required for regulations (±15V,±12V for DPM 50/80, 5V, 24V, fans (not for 200A and 300A) are taken internaly from the D.C direct voltage (rated 550V) which may be obtained :

- either via a single-phase supply from the mains, between two phase wires ahead of the main contactor (terminal block B2 input);
- or from an independent single-phase supply (230V or 400V/480V), connected to terminal block B2. In this case**, the supply must be isolated from the mains by a transformer** (secondary 230V or 400V/480V ±10% 100VA for DPM 50/80 to DPM 150 and 200 VA for DPM 200 and DPM 300).

UL and c UL compliance required: AM2A or ATDR2A fuses (Class CC UL fuses) are necessary to protect the auxiliary input.

MARKING	TERMINAL	FRONT PANEL	FUNCTION	TERMINAL BLOCK TYPE	TERMINAL CAPACITY
B2/1 B2/2	u1 v1	AUXILIARY SUPPLY	Low Level Supply	fixed, screw-type	min 0,2 mm² max 4 mm² flexible wire max 6 mm² rigid wire

5.6 Brake Supply Connection (Terminal block B3)

A 24V supply may be fed into this terminal block for the brake fitted to the motor. It is fed to the motor terminal block B4.

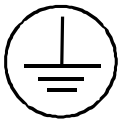
Regulated/filtered 24V ±10%. Protection against overvoltage by 26 Joule varistor. This protection is operational from 30V.

UL and c UL compliance required: 2A fuse (UL recommended) on the +24VDC voltage.

WARNING: Do not use the 24V on terminal block B7 for this function.

MARKING	TERMINAL	FRONT PANEL	FUNCTION	TERMINAL BLOCK TYPE	TERMINAL CAPACITY
B3/1 B3/2	+24V 0V	BRAKE SUPPLY	24V input for brake	unpluggable, screw-type	min 0,2 mm² max 2,5 mm² flexible wire and rigid

5.7 Earth connection



Chassis earth:

To comply with UL 508 C, the earth wire cross-section should be at least 10AWG (6mm²)
To comply with existing standards, the copper earth wire cross-section should be identical to that of the mains connection up to 16 mm².
For "mains" cross-sections between 16 mm² and 35 mm², the minimum cross-section for the ground conductor is 16 mm².
For "mains" cross-sections greater than 35 mm², the cross-section of the ground conductor should be at least equivalent to half the cross-section of the mains conductor.

5.8 Short-circuit capability

UL and c UL compliance required: the DPM50/80 should be used with power circuits with a maximum capability of current equal to 5000Arms symmetrical (UL 508 C)

5.9 Motor end connection

5.9.1 Terminal block B4 and B5

MARKING	TERMINAL	FRONT PANEL	FUNCTION	TERMINAL BLOCK TYPE	TERMINAL CAPACITY
B4/1 B4/2 B4/3 B4/4	TH TH + -	TH BR	Motor thermal protector Motor brake control	unpluggable, screw-type	min 0,2 mm² max 2,5 mm² flexible wire and rigid
B5/1 B5/2 B5/3	U1 V2 W2	MOTOR	Connection to Motor	Fixed screw-type	**DPM 50/80** max 10 mm² flexible max 16 mm² rigid **DPM100A** max 25 mm² flexible max 35 mm² rigid **DPM 150 and DPM 200** max 50 mm² flexible max 50 mm² rigid **DPM 300** 35 mm² rigide 95 mm² maxi

5.9.2 Motor Power connection

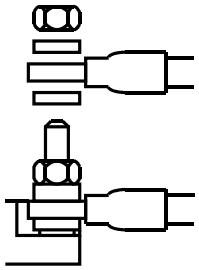
UL and c UL compliance required: Only use cables with copper core
There are two possibilities for connection:

Terminal block + resolver connector.
Power connector + resolver connector.

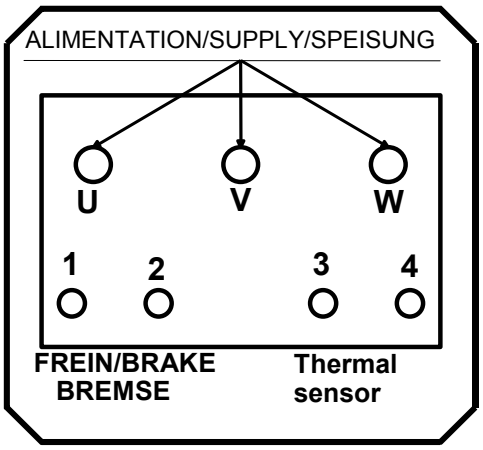
5.9.3 Terminal block connection

For the terminal block, the clamping nuts and washer come in a bag
Take care when fitting the lugs not to loosen the connecting leads between the motor and the terminal block.

The power connection lugs are to be inserted between the striated washer and the flat washer.



Motor direction of rotation: by wiring as recommended, a positive set point applied to the drive entails clockwise rotation (viewed from the power shaft end).



U Phase U

V Phase V

W Phase W

1 Optional brake +24 V cable ≥ 1mm²

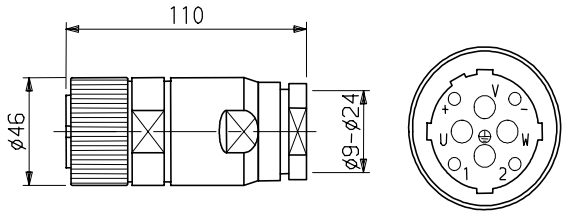
2 Optional brake 0 V

3 Thermal sensor cable ≥ 1mm²

4 Thermal sensor

5.9.4 Power connector connection

Power can be connected using a connector as an option. The removable part of the connector (plug) can be supplied on request.



PLUG 220065R3610
PERMISSIBLE CABLE CROSS-SECTION FOR PLUGS
PLUG 220065R3610: Power & Ground: 6 - 16 mm². Brake & thermal protection: 1 - 2.5 mm².

FUNCTION	PIN OUT 220065R3610	CABLE COLOUR
BRAKE + BRAKE -	+ -	Green/Red Green/Blue
THERMAL PROT. THERMAL PROT.	1 2	Orange Yellow
GROUND	⏚	Green/Yellow -
U_2 V_2 W_2	U V W	Black White Red
Shielding to be connected to the earth at the servoamplifier end ⏚		Green/Orange

5.9.5 "POWER" Cable Definition

The power/drive connector cables must have as a minimum requirement :

- Three insulated conductors connected to U2, V2, W2 phases. Cross-sections as in the table below. The internal chokes of the DIGIVEX Power Motion allow, as a general rule, there is no need to use shielding on the three power conductors.
- one ground conductor (green/yellow).
- one shielded twisted pair for connection of the motor thermal protection. Cross-section of about 1 mm².
- one shielded twisted pair for connection of the holding brake (if fitted). Cross-section of about 1 mm².
- 1 " shielding continuity " conductor (green/orange) to be connected to the servoamplifier earth ⏚

Power cable cross-section

Cable cross-sections shown in the table below make allowance for :

- rated drive current;
- motor/drive distance, service voltage loss = RI.
- ambient temperature, cable Joule losses = RI².
- standardised increase of cable cross-sections.

Depending on distance, following cable cross-section should be used (ambiant < 40°C).

Distance ➔	0m	100m	200m
DIGIVEX Rating	Cable cross-section in mm²		
DPM 50/80	10		16/25*
DPM 100/120	25		25/50**
DPM 150	50		50/70**
DPM 200	50 ***		
DPM 300	95 ***		

* In the case of a 230V three-phase power supply, cross-section not compatible with the power terminal blocks, provide an intermediate terminal block.
** In the case of a 230V three-phase power supply.
*** For an ambient temperature of 30°C

Power cable list, power plugs and equiped cables for H series motors.

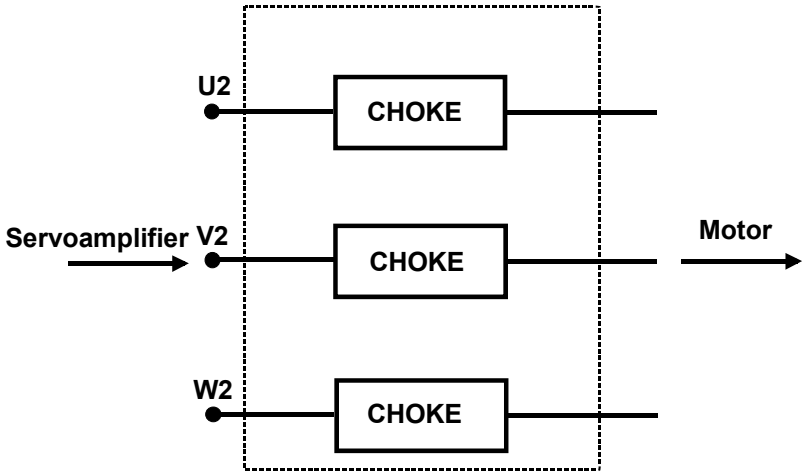
MOTOR	Cable cross-section (mm²)	Power Cables 6537P0012	Power Plugs (1)	Equiped cables
NX860 HD-HX-HV800	6	6537P0011	-	-
HS900 HD-HV900	10	6537P0012	220065R3610	220049R46..
HXA-HVA every HW	16	6537P0013	220065R3610	220049R47..
HD-HV1000	25	6537P0014		

Length 05m/10m/15m/25m/50m. Add the cable length to the equiped cable reference.
(1) Option for H motors

5.9.6 Guidelines for long cables between the motor and drive

For the DPM 50/80, DPM 100/120 and DPM 150, provide inductors for lengths of more than 70m (standard cable) or 50 m (shielded cable) as shown in the table below. These inductors cannot be used with flux weakening motors (spindle motors). The cable length must be less than 70m (standard cable) or 50 m (shielded cable) for these motors.

To be fitted between the DIGIVEX Power Motion (as close as possible to the drive) and the motor. Dimensions



		DPM 50/80	DPM 100/120	DPM 150
Length cable	Standard	70 to 200 m	100 to 200 m	
	Shielded	50 to 135 m	70 to 135 m	
Choke		SF02026 340 µH	SF02026 340 µH	SF02027 190 µH

5.9.7 Holding Brake Connection

Brushless motors may be fitted with a brake of suitable dimensions to hold the motor immobilised. If 24 V dc ±10% is applied across the brake terminals, the brake disc is released and the motor can rotate.

The 24 V dc current for brake control must be regulated/filtered. It is to be connected to terminal block B3 and is then distributed internally. The brake is to be connected to terminals B4/3 and B4/4.

5.9.8 Thermal protection Connection

The 2 terminals of the PTC sensor or dry contact, located in the motor terminal box, are to be connected to B4/1 and B4/2.

5.9.9 Motor Ventilation Connection

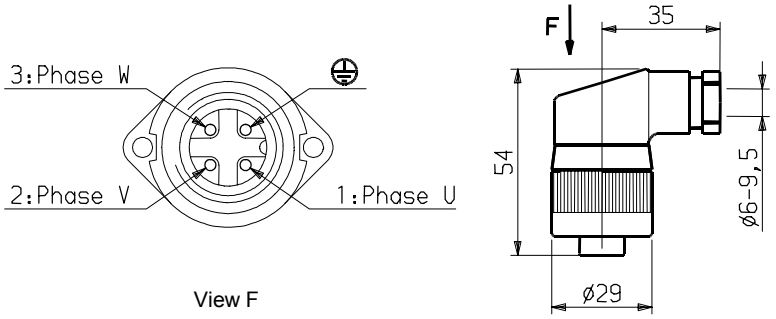
Some motors can be delivered as fan-cooled versions.

Fan characteristics :

- Supply voltage : 400V or 480V three-phase, 50/60 Hz as standard.
- Power consumption : 45 W
- Connector type connection (plug 220056P0200 supplied on request).

When connecting check the direction of fan rotation and check that airflow is produced. The direction of airflow is shown on the dimension drawings.

Removable connector plug



View F

5.10 Automatic control Input / Output connection

5.10.1 Terminal block B6 and B7

MARKING	TERMINAL	FRONT PANEL	FUNCTION	TERMINAL BLOCK TYPE	TERMINAL CAPACITY
B6/1	1	READY	Drive ready for connection to mains	unpluggable, screw-type	min 0,2 mm² max 2,5 mm² flexible wire and rigid
B6/2	2				
B6/3	3	OK	regulation and power OK		
B6/4	4				
B7/1	+24V		24V « user » output	unpluggable, screw-type	min 2 mm² max 2,5 mm² flexible wire and rigid
B7/2	0V				
B7/3	+15V*		+/-15V* « user » output		
B7/4	0V				
B7/5	-15V*				
B7/6	+	RESET	logic input		
B7/7	-				

*+/-12V for DPM 50/80

- B7/1 24 V regulated
- B7/2 0 V of 24 V

- Max. 24 V - 50 mA power supply. **Do not use for brake supply**.
- Protection against overloads and short circuits by current limitation.

This supply is for logic inputs but is also used internally for the fan power supply. There is no common point with the metal case.

- B7/3 +15V regulated (+12V regulated for DPM 50/80)
- B7/4 0V of 15V (0V of 12V regulated for DPM 50/80)
- B7/5 -15V regulated (-12V regulated for DPM 50/80)

- Maximum power supply +/-15V - 10mA (maximum of +/-12V - 100mA for DPM 50/80)
- Protected by 47 ohms resistor (DPM 50/80 protected by regulator)

This supply is common with the internal supply of the POWER SUPPLY module. There is no common point with the metal casing.

- B7/6 Reset + (24V DC logic input)
- B7/7 Reset- (0V)

A 24 V rising edge applied across B7/6 compared with B7/7 resets the system after a power supply or drive fault.
Note that the front panel reset button can also be used, or turning off the power completely (power and auxiliaries).
This control has no effect during normal operation.
The system must be "reset" after any active fault.

See the PME-DIGIVEX Motion setting and adjustment manual for further details.

5.10.2 main contactor control

- B6/1 - B6/2 : READY contact

Cut-out power : max voltage 250 Vac, max 1A.

This contact is closed if :

- the D.C voltage is correct (>200V dc),
- the drive has not indicated any "regulation" type fault (no resolver, incorrect low level auxiliary supply, fault not erased by "reset").

This contact allows test closure of the main contactor. The "POWER OFF" LED lights.
It is mandatory to wire the ready contact into the power supply automatic control line of the main contactor.

- B6/3 - B6/4 : OK Contact

Cut-out power : max voltage 250 Vac, max 1A.

The contact is closed if :

- power supply is present (>200 V dc)
- the servoamplifier, auxiliary and power, indicates no faults

The contact allows the main contactor to be self-maintained

- the green POWER ON LED lights.

Main contactor management

Closure of the "READY" relay (if the external safety devices are correct) authorises closure of the main contactor, if the ON push button is activated. The OK relay button ensures the main contactor self-holds for 30 ms after the ON command.

Conversely, opening of the "OK" relay causes the main contactor to open. The "OK" relay opens in the following circumstances :

- No phase
- Recovery fault
- Maximum power bus voltage
- Minimum power bus voltage
- Drive fault
- Auxiliary supply fault
- Overcurrent
- Current capacitors charging circuit damaged (current limiting resistor open or internal contactor damaged).

5.11 Resolver Connection

5.11.1 Description

The resolver is a high precision sensor (± 10 angular minutes as standard). It must be carefully wired :

- Separately routed power cable.
- Twisted pair cable (sine, cosine, and excitation) with individual shielding of the pairs. The three pairs shielding should be connected to the metal cap of the SUB-D plug. Do not connect the pair shielding at the motor end

PARVEX can supply the cable in either of two versions :

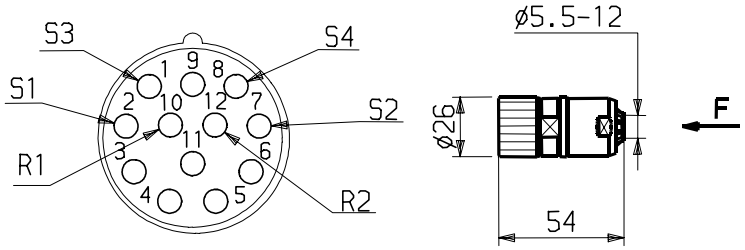
- Separate cable, in this case wire as shown in the diagram below.
- Cable fitted with SUB-D plug at drive end and connector at motor end. This solution is strongly recommended as the cable is ready for use.

Maximum distance between resolver and DIGIVEX Power Motion : 200 m. Please ask about longer cables.

Maximum permissible cross-sections :

- For SUB-D plug : 0.5 mm^2.
- For removable connector plug. 0.14 to 1 mm^2 (solder or crimp-fit contacts)

RESOLVER REMOVABLE CONNECTOR PLUG (connection at motor end)
220065R4621 (solder contacts - standard)
220065R1621 (crimp-fit contact)



View F

For XD motors

Connection with SUB-D plug on rear cover (cable inserted through special gland).

Please ask for details.

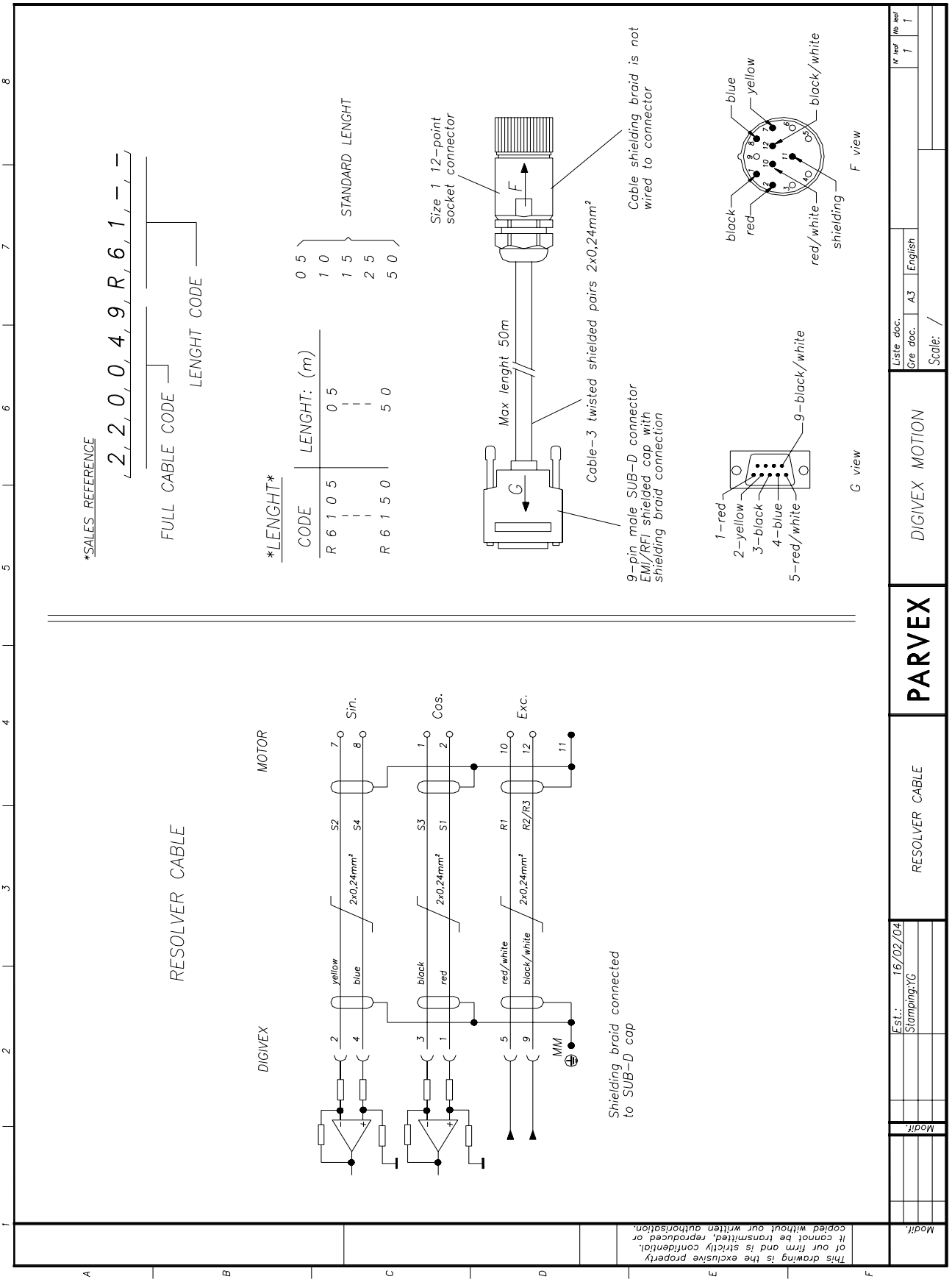
5.11.2 Sub-D connector X4:"Resolver"

DIGIVEX end connections, Sub-D 9 pin connector item ref. X4 "RESOLVER".
Maximum conductor cross-section: 0.5 mm²

CONTACT	TYPE	FUNCTION
1	Input	Cosine S1
2	Input	Sine S2
3	Input	Cosine S3
4	Input	Sine S4
5	Output	Excitation R1
6	-	Unused
7	-	Unused
8	-	Unused
9	Output	0V Excite R2/3

5.11.3 Cables

Cables by meter: product number *: 6537P0001*
Complete cables (fitted with plug at the motor end and SUB-D connectors at the DPM end):
product number *220049R61xx (xx :* length in metres *5m/10m/15m/25m/50m).*


*SALES REFERENCE
2,2,0,0,4,9,R,6,1,-,-
FULL CABLE CODE
LENGHT CODE
LENGHT
CODE
LENGHT: (m)
R 6 1 0 5
R 6 1 5 0
0 5
1 0
1 5
2 5
5 0
STANDARD LENGHT
Size 1 12-point socket connector
Max lenght 50m
Cable-3 twisted shielded pairs 2x0,24mm²
9-pin male SUB-D connector EMI/RFI shielded cap with shielding braid connection
Cable shielding braid is not wired to connector
F view
G view
blue
yellow
black/white
black
red
red/white
shielding
1-red
2-yellow
3-black
4-blue
5-red/white
9-black/white
RESOLVER CABLE
DIGIVEX
MOTOR
Sin.
Cos.
Exc.
yellow
blue
black
red
red/white
black/white
2x0,24mm²
S2
S4
S3
S1
R1
R2/R3
MM
Shielding braid connected to SUB-D cap
This drawing is the exclusive property of our firm and is strictly confidential. It cannot be transmitted, reproduced or copied without our written authorisation.
Modif.
Est.: 16/02/04
Stamping:YG
RESOLVER CABLE
PARVEX
DIGIVEX MOTION
Liste doc.
Gre doc.
A3
English
Scale: /
N° ref 1
No ref 1

5.12 FIELDBUS Connections

5.12.1 SUB-D X1 plug : FIELDBUS

Identify the nameplate on the front end :

→ FIELDBUS = CANopen

→ FIELDBUS = Profibus

5.12.2 CANopen connections and cables

See DIGIVEX Motion - CANopen manual : PVD 3518

5.12.3 Profibus connections and cables

See DIGIVEX Motion - Profibus manual : PVD 3554

5.13 Input/Output connection

5.13.1 SUB-D X2 socket: Inputs/Outputs

CONTACT	TYPE	FUNCTION	CHARACTERISTICS
1 2 20	0 V -12 V +12 V	Symmetrical supply available for analogue I/O	Max. current available = ±50 mA
3 21	outa 0 V	±10V analogue output	Analogue conversion: ≈ 9 bits + sign Output ±10V / 3 mA Protected against short circuits
4 22	ina + ina -	±10 V analogue input	Analogue conversion: 13 bits + sign Differential input
28 10	+ 24V 0V (1)	+24 V input for logic output supply 0V logic outputs	max. 400 mA for 8 outputs Internally connected to X2-7 and X2-23
9 27 8 26 7	out 0 out 1 out 2 out 3 0V (1)	Logic outputs Logic outputs Logic outputs Logic outputs 0V logic outputs	24 V PNP, optocoupled, max. 50 mA outputs, protected against short circuits Internally connected to X2-10 and X2-23
25 6 24 5 23	out 4 out 5 out 6 out 7 0V (1)	Logic outputs Logic outputs Logic outputs Logic outputs 0V logic outputs	24 V PNP, optocoupled, max. 50 mA outputs, protected against short circuits Internally connected to X2-7 and X2-10
37 18 36 17 35 16 34 15 19	in0 in1 in2 in3 in4 in5 in6 in7 COM0	Logic input Logic input Logic input Logic input Logic input Logic input Logic input Logic input Common for inputs in0-in7	Optocoupled logic inputs, type 1 under IEC 1131-2
33 14 32 13 31 12 30 11 29	in8 in9 in10 in11 in12 in13 in14 in15 COM1	Logic input Logic input Logic input Logic input Logic input Logic input Logic input Logic input Common for inputs in8-in15	Optocoupled logic inputs, type 1 under IEC 1131-2

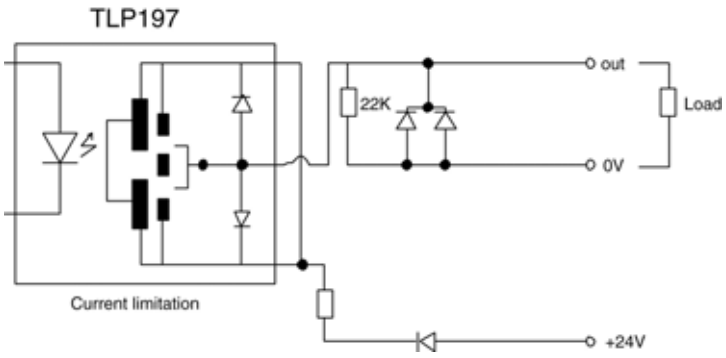
5.13.2 Input/Output characteristics

5.13.2.1 Logic outputs (out0 - out7)

- opto-mos outputs (2.5 kV isolation voltage), 24 V dc / 50 mA,
- PNP-type static outputs (load connected to negative supply pole) with diode in parallel on load and protection by current limitation,
- an output is said to be at 1 if it is activated (24 V dc output),
- user must provide 24 V dc supply for outputs (18 V ac rectified, filtered),
- 24 V dc supply input protected against reversals of polarity (diode).

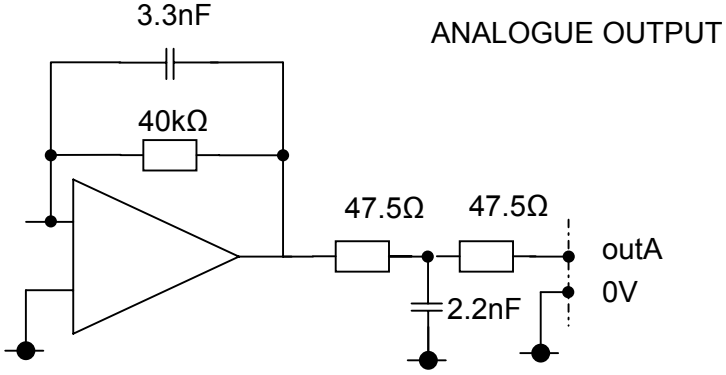
To avoid any ill-timed output status change during drive initialization (when the auxiliary power supply appears), it is recommended to wait about 3 seconds before switching on the 24V DC supply of the outputs.

	MIN	TYPICAL	MAX
Supply voltage	5 V	24 V	40 V
Output current (level 1)	0.05 mA	-	50 mA
Residual current (level 0)	-	-	0.001 mA
Response time Ton (0-1)	-	0.3 ms	1 ms
Response time Toff (1-0)	-	0.2 ms	1 ms
Output voltage drop I = 50 mA	-	-	2 V



5.13.2.2 Analogue output (outa)

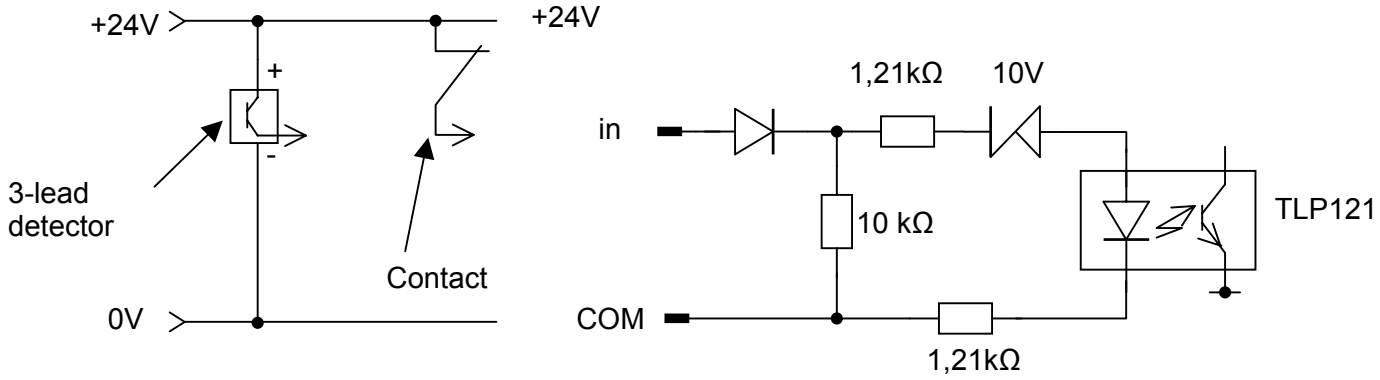
Analogue output : +/-10V
Resolution : ≈ 10 bits (9 bits + 1 sign bit)
Maximum output current : 5 mA (minimum load 2 K)
Source impedance : 100 ohms



5.13.2.3 Logic inputs (in0 - in 15)

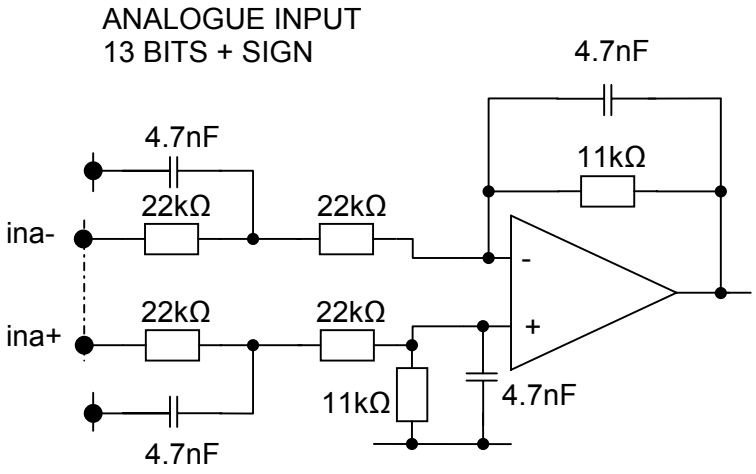
- opto-coupled 24V dc inputs (5 kV isolation voltage),
- type 1 inputs under IEC 1131-2,
- input load resistance: 10 K,
- an input is said to be at 1 if it is activated (24 V dc output). Otherwise it is said to be at 0,
- inputs may be connected directly to PNP type outputs (no external load resistor required),
- possibility of connecting 24 V dc "NC (normally closed) or NO (normally open) inductive proximity detectors : 3-lead, PNP output type (load connected to negative supply pole.

	MIN	TYPICAL	MAX
Input voltage (level 0)	-	0 V	5 V
Input voltage (level 1)	15 V	24 V	30 V
Input current (level 0)	-	0 mA	0.5 mA
Input current (level 1)	3 mA	7 mA	10 mA
Response time Ton (0-1) Inputs In0-In3 Other inputs (in4-in15)	 - -	 0.2 ms 1 ms	 - -
Response time Toff (1-0) Inputs In0-In3 Other inputs (in4-in15)	 - -	 0.2 ms 1 ms	 - -



5.13.2.4 Analogue input (ina)

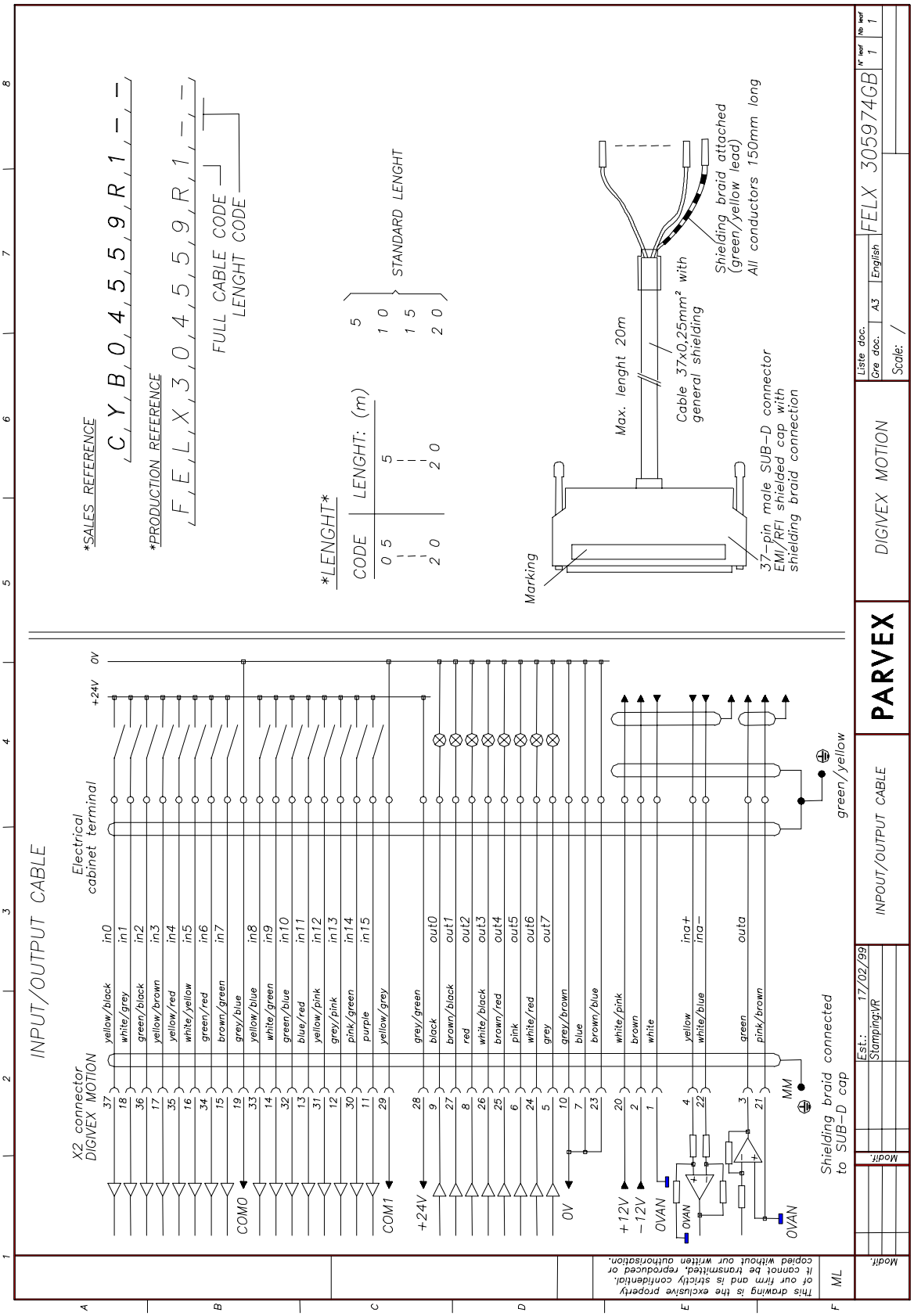
- Differential input : +/-10V
- Resolution : 14 bits (13 bits + 1 sign bit)
- Input impedance : >40kΩ
- Maximum consumption on +12 V : 10 mA max.
- Maximum consumption on -12 V : 10 mA max.



5.13.3 Cable

Bare cables: product number : CB 08304
Complete cables product number : CYB04559R1 xx (xx : defines the length in m) (equipped with SUB-D connectors). See drawing FELX 305974.

Product number of cable supplied by meter by Parvex: product number CB08307


INPUT/OUTPUT CABLE
X2 connector DIGIVEX MOTION
Electrical cabinet terminal
+24V
0V
*SALES REFERENCE
CYB045599R1--
*PRODUCTION REFERENCE
FELX30455 9R1--
FULL CABLE CODE
LENGHT CODE
LENGHT
CODE | LENGHT: (m)
05 | 5
10 | STANDARD LENGHT
15
20
Marking
Max. lenght 20m
Cable 37x0,25mm² with general shielding
Shielding braid attached (green/yellow lead)
All conductors 150mm long
37-pin male SUB-D connector EMI/RFI shielded cap with shielding braid connection
COM0
COM1
+24V
0V
+12V
-12V
OVAN
MM
Shielding braid connected to SUB-D cap
green/yellow
PARVEX
DIGIVEX MOTION
INPOUT/OUTPUT CABLE
FELX 305974GB
Est.: 17/02/99
Stamping:VR
Modif.
ML
Liste doc.
Gre doc.
A3
English
Scale: /
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5.14 Encoder emulation option connection (SC6639)

5.14.1 Description

This optional board, fitted in the DPM, converts the signal from the resolver into a series of pulses identical to those from an incremental encoder: A, B, Zero Mark and their complements.

5.14.2 Sub-D connector X3: encoder emulation option

Sub-D 9-pin plug, "Encoder". Maximum conductor cross-section: 0.5 mm².

CONTACT	TYPE	FUNCTION	Characteristics
5	Input	5V	Max. current = 100 mA
9	Input	0V	
7	Output	A	Encoder channel A
3	Output	$\overline{A}$	Encoder channel $\overline{A}$
8	Output	B	Encoder channel B
4	Output	$\overline{B}$	Encoder channel $\overline{B}$
6	Output	zero mark	Encoder channel zero mark
2	Output	$\overline{\text{zero mark}}$	Encoder channel $\overline{\text{zero mark}}$

5.14.3 Programming resolution and zero mark position

This is done with the PME DIGIVEX-Motion. (See the Manual PVD3516)

These parameters can be called up by selecting the "Input/Output parameters menu with the "options" tab.

Resolution

Adjustable between 1 and 16384, either by +/- keys, or be entering the number directly (in "OFF LINE" mode only).

Zero Mark Setting

Adjust by trial-and-error with the PC working in "ON LINE" mode.

When the operator judges the position is suitable, he confirms by acknowledging the zero mark.

5.14.4 Electrical characteristics

The electrical output interface meets standard RS422 for differential serial links. The circuit used is a "LINE DRIVER" of the 26C31 type. The electrical characteristics are therefore closely related to the use of this component.

Voltage supply

The encoder emulation boards are electrically isolated between the output stage through three optocouplers, needing to be powered by an external +5V ±10%, 100 mA source, as for all incremental encoders.

In no case can this power supply, which is intended only for electrical isolation, be used to keep position information from the resolver in the event of failure of the drive's low-level power supply.

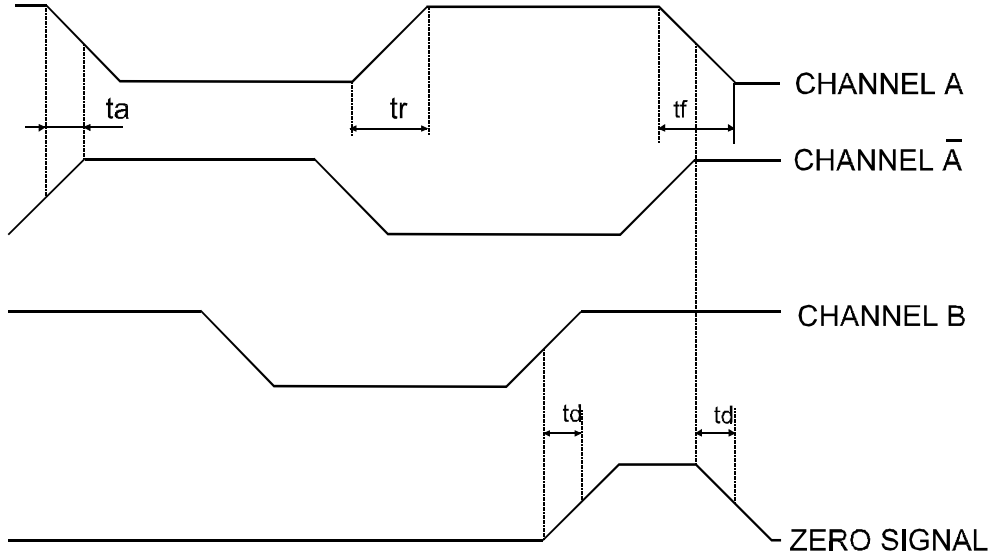
Short-circuit capability

A single output may be short-circuited at 0 V at any given time

Signal form

Signal levels:

- U high ≥ 2.5V for I high ≥ -20mA
- U low ≤ 0.5V for I low ≤ 20mA



Switching time:

Rise or fall time defined from 10% to 90% of the magnitude in question, without cable and without load.

tr = tf = 45ns (typical value)

Time delay between direct and complemented channels

Time delay defined at 50% of magnitudes in question without cable and without load.

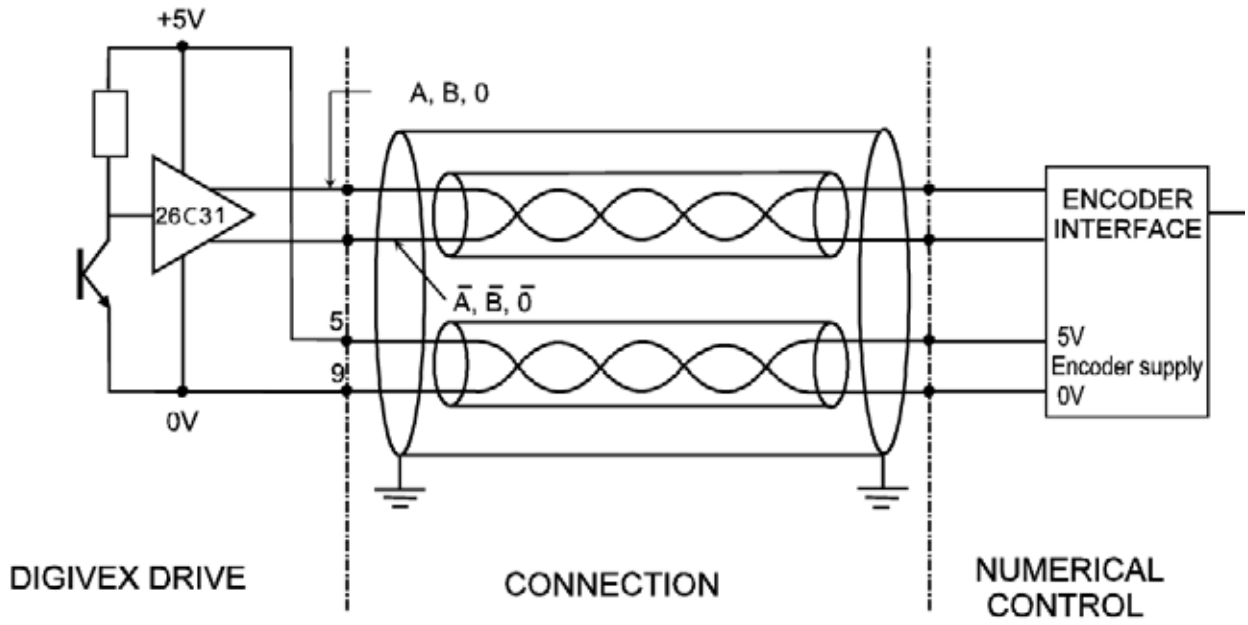
-6ns ≤ ta ≤ 6ns (maximum)

maximum frequency : 500 kHz on signals A or B

Time interval between channels A, B and the zero mark

Time delay defined at 50% of magnitudes in question without cable and without load.

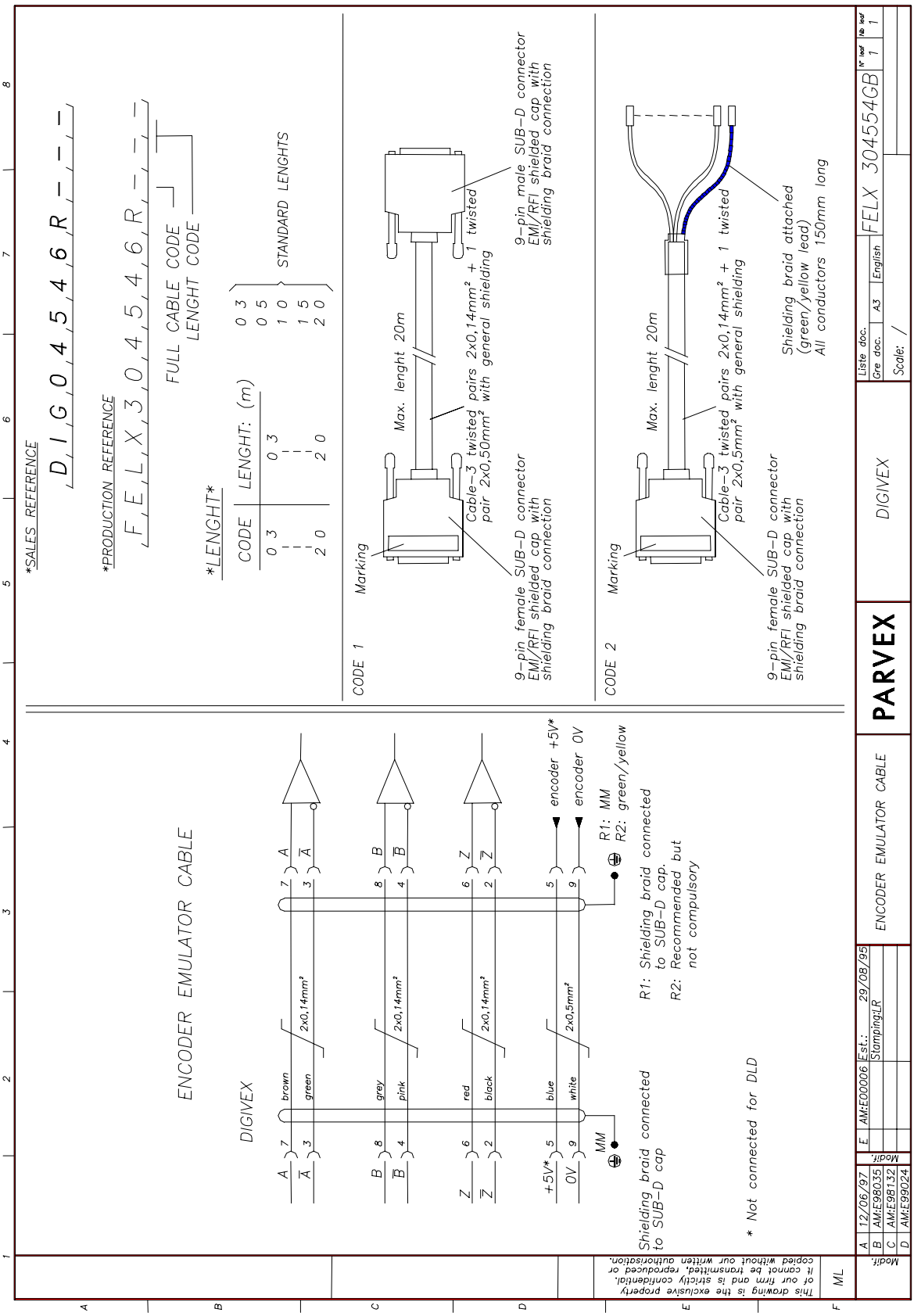
$$-6ns \leq td \leq 6ns \text{ (maximum)}$$



5.14.5 Cable

Cable can be supplied with SUB-D connectors, see drawing FELX 304554.

Product number DIG 04546R1xx (2 SUB-D connector)
DIG 04546R2xx (1 SUB-D connector)
(xx : defines length in meters)


*SALES REFERENCE
DLG045466R---
*PRODUCTION REFERENCE
FLLX30454 6R---
FULL CABLE CODE
LENGHT CODE
LENGHT
CODE | LENGHT: (m)
03 | 03
20 | 20
STANDARD LENGHTS
03
05
10
15
20
CODE 1
Marking
Max. lenght 20m
Cable-3 twisted pairs 2x0,14mm² + 1 twisted pair 2x0,50mm² with general shielding
9-pin female SUB-D connector EMI/RFI shielded cap with shielding braid connection
9-pin male SUB-D connector EMI/RFI shielded cap with shielding braid connection
CODE 2
Marking
Max. lenght 20m
Cable-3 twisted pairs 2x0,14mm² + 1 twisted pair 2x0,5mm² with general shielding
9-pin female SUB-D connector EMI/RFI shielded cap with shielding braid connection
Shielding braid attached (green/yellow lead)
All conductors 150mm long
ENCODER EMULATOR CABLE
DIGIVEX
A 7
Ā 3
B 8
B̄ 4
Z 6
Z̄ 2
+5V* 5
0V 9
MM
brown
green
grey
pink
red
black
blue
white
2x0,14mm²
2x0,5mm²
encoder +5V*
encoder 0V
R1: MM
R2: green/yellow
Shielding braid connected to SUB-D cap
R1: Shielding braid connected to SUB-D cap.
R2: Recommended but not compulsory
* Not connected for DLD
PARVEX
DIGIVEX
ENCODER EMULATOR CABLE
FELX 304554GB
Liste doc.
Gre doc.
A3
English
Scale: /
1er feuil 1
No feuil 1
E AM:E00006 Est.: 29/08/95 Stamping:LR
A 12/06/97 AM:E98035
B AM:E98132
C AM:E99024
D
Modif.
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ML

5.15 External encoder input option connection (SC6638)

5.15.1 Description

This option board, placed in the DPM, is used to connect an external incremental encoder which may be used:

- either as a master axis for synchronization with an external moving component, or as a cam type function
- or as a position measuring device if position measurement given by the resolver is unsuitable,
  Caution: in this case, the resolver must be connected nevertheless.
- or as a position measuring device for refined applications where allowance must be made for position on the part and not on the motor,
  Caution: in this case, the resolver must be connected nevertheless.
- or as an automatic control and a position measuring device
  Caution: in this case, the motor shaft must be mechanically free so that the motor can be polarized using user program as Motor_polarization.bdm which is to be found under : C:\Program Files\Parvex\Pme4.xx\App_Parvex\Samples\Misc.
  The drive in7 input and out7 output are assigned to this program :
  - in7 = 1 authorizes the polarization phase to start.
  - out7= 1 when the polarization phase is completed.

  This program is only given as an example and can be modified according to the customer application.

The position sensor must be an incremental encoder type, with complemented track, with a line driver:

- tracks A, $\overline{A}$, B, $\overline{B}$, zero mark, $\overline{\text{zero mark}}$
- supply +5 V
- maximum consumption 250 mA
- maximum frequency: 250 kHz on signals A or B
- Encoder +5V supply voltage is provided by the DPM from a +24V DC external supply.

5.15.2 SUB-D X3 sockets: encoder input option

CONTACT	TYPE	FUNCTION	Characteristics
5 9	Output Output	5V 0V	max. 250 mA encoder supply Output ⚠ : + 24 V supply to sockets X2-28 / X2-10 is required for encoder supply
7 3	Input Input	A $\overline{A}$	Encoder channel A Encoder channel $\overline{A}$
8 4	Input Input	B $\overline{B}$	Encoder channel B Encoder channel $\overline{B}$
6 2	Input Input	Zero mark $\overline{\text{zero mark}}$	Encoder channel zero mark Encoder channel $\overline{\text{zero mark}}$

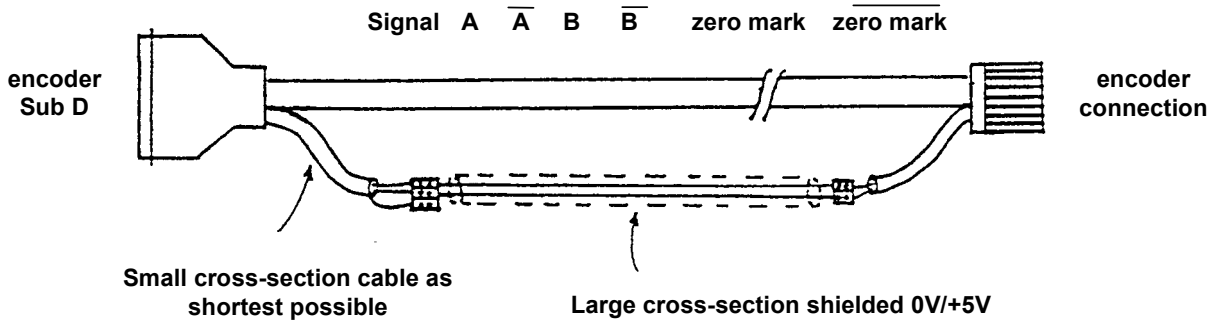
5.15.3 Cable

The DPM-Encoder connection cable shall be made up of three twisted pairs of cross-section of 14 mm^2 or more (for signal transmission) and one larger pair (for encoder supply).

Encoder supply cable cross-section:

- 20 m cable 150 mA current → 0.5 mm²
- 35 m cable 150 mA current → 1 mm²
- 10 m cable 200 mA current → 0.5 mm²
- 20 m cable 200 mA current → 1 mm²
- 50 m cable 200 mA current → 2.5 mm²
- 10 m cable 250 mA current → 0.75 mm²
- 20 m cable 250 mA current → 1.5 mm²
- 40 m cable 250 mA current → 2.5 mm²

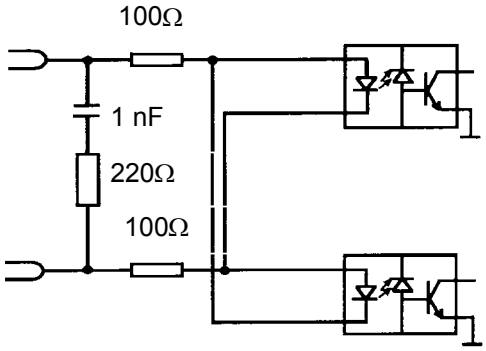
Some of the cross-sections defined above are difficult to wire to a SUB-D connector, in which case the following wiring arrangement may be used.

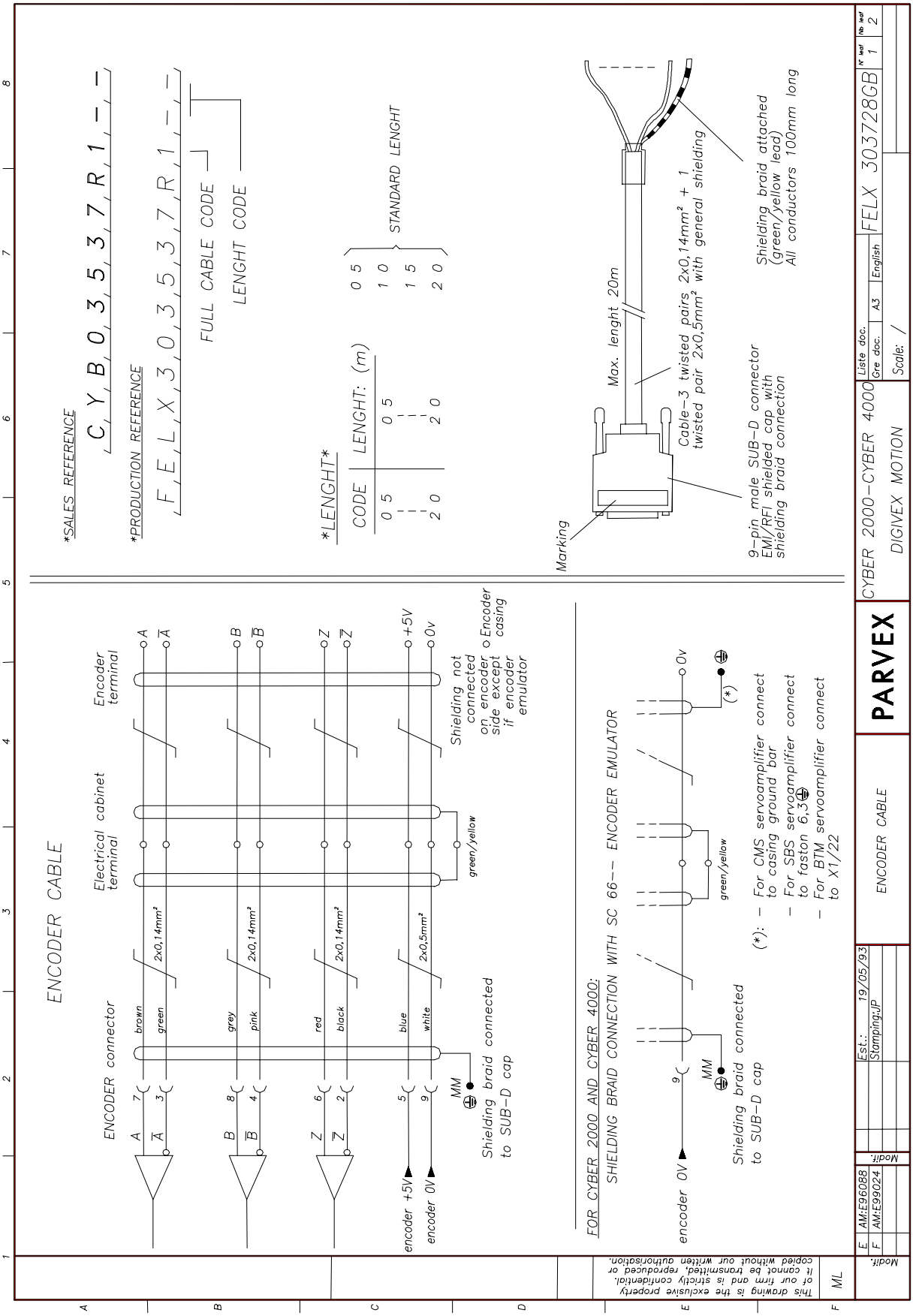

Signal A $\overline{A}$ B $\overline{B}$ zero mark $\overline{\text{zero mark}}$
encoder Sub D
encoder connection
Small cross-section cable as shortest possible
Large cross-section shielded 0V/+5V

For higher values an external +5V supply must be installed near to the encoder to prevent voltage loss over long lengths of cable.

Input interface :

Input voltage MIN.	MIN	TYPYCAL	MAX
level 0	-	0 V	1 V
level 1	3 V	5 V	5.5 V




ENCODER CABLE
ENCODER connector
Electrical cabinet terminal
Encoder terminal
brown
green
grey
pink
red
black
blue
white
2x0,14mm²
2x0,5mm²
green/yellow
Shielding braid connected to SUB-D cap
Shielding not connected on encoder side except if encoder emulator
Encoder casing
encoder +5V
encoder 0V
FOR CYBER 2000 AND CYBER 4000:
SHIELDING BRAID CONNECTION WITH SC 66-- ENCODER EMULATOR
(*): - For CMS servoamplifier connect to casing ground bar
- For SBS servoamplifier connect to faston 6,3
- For BTM servoamplifier connect to X1/22
*SALES REFERENCE
CYB035337R1---
*PRODUCTION REFERENCE
FELX30353737R1---
FULL CABLE CODE
LENGHT CODE
LENGHT
CODE | LENGHT: (m)
05 | 05
10 | 15
20 | 20
STANDARD LENGHT
Marking
Max. lenght 20m
Cable-3 twisted pairs 2x0,14mm² + 1 twisted pair 2x0,5mm² with general shielding
9-pin male SUB-D connector EMI/RFI shielded cap with shielding braid connection
Shielding braid attached (green/yellow lead) All conductors 100mm long
PARVEX
CYBER 2000-CYBER 4000
DIGIVEX MOTION
ENCODER CABLE
FELX 303728GB
Scale: /
Est.: 19/05/93
Stamping:JP
AM:E96088
AM:E99024
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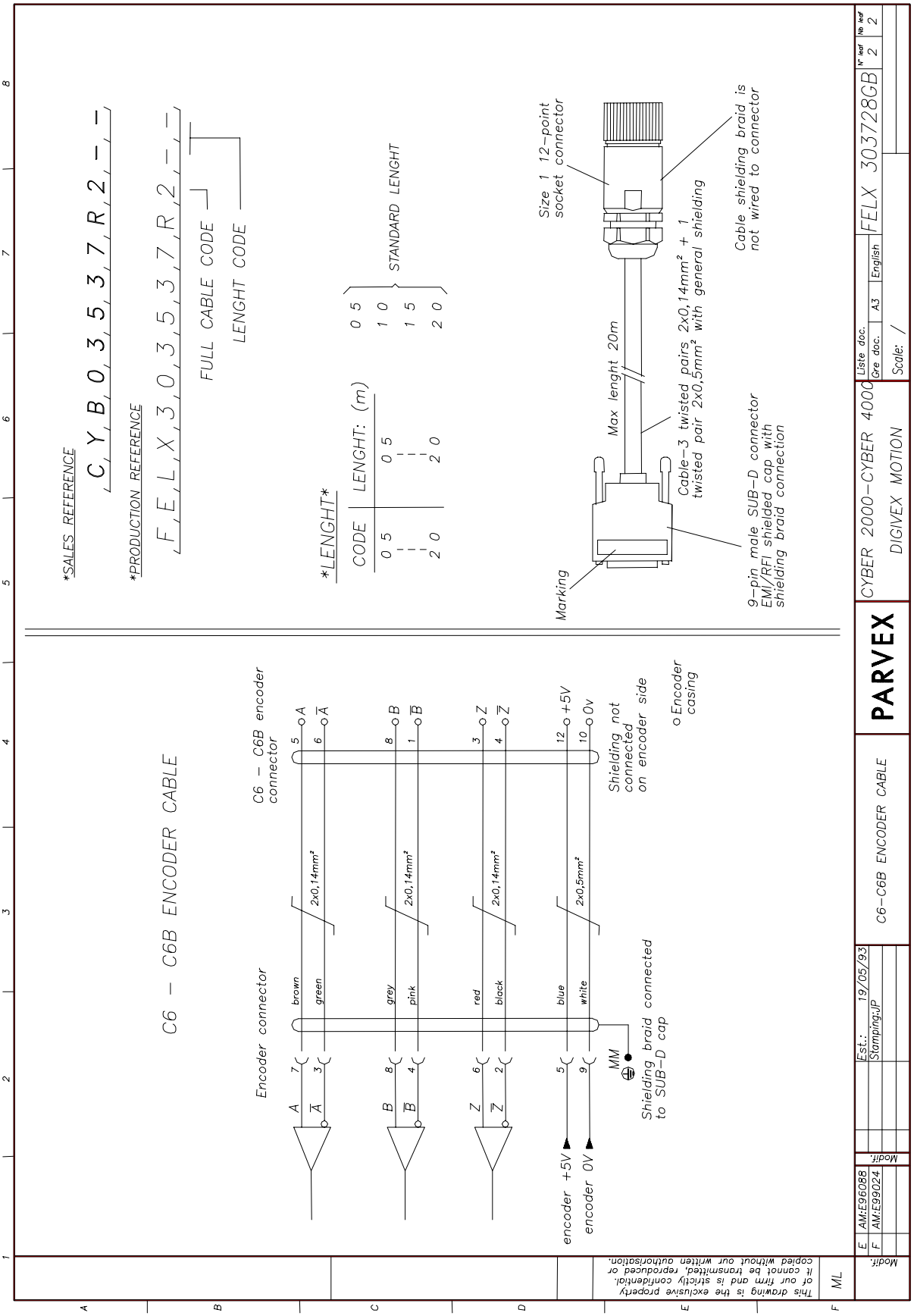
*SALES REFERENCE
CYB035337R2
*PRODUCTION REFERENCE
FELX303537R2
FULL CABLE CODE
LENGHT CODE
LENGHT
CODE | LENGHT: (m)
05 | 05
10 | 10
15 | 15
20 | 20
STANDARD LENGHT
Size 1 12-point socket connector
Max lenght 20m
Cable-3 twisted pairs 2x0,14mm² + 1 twisted pair 2x0,5mm² with general shielding
Cable shielding braid is not wired to connector
Marking
9-pin male SUB-D connector EMI/RFI shielded cap with shielding braid connection
C6 - C6B ENCODER CABLE
Encoder connector
C6 - C6B encoder connector
A
Ā
B
B̄
Z
Z̄
+5V
0V
brown
green
grey
pink
red
black
blue
white
2x0,14mm²
2x0,5mm²
Shielding braid connected to SUB-D cap
Shielding not connected on encoder side
Encoder casing
encoder +5V
encoder 0V
MM
PARVEX
C6-C6B ENCODER CABLE
CYBER 2000-CYBER 400
DIGIVEX MOTION
FELX 303728GB
Liste doc.
Gre doc.
A3
English
Scale: /
Est.: 19/05/93
Stamping:JP
AM:E96088
AM:E99024
Modif.
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5.16 Connecting the SinCos encoder input option (SC6645)

5.16.1 Description

This optional card, placed in the DPM, is used to connect a SinCos encoder which acts as an automatic motor and position measurement control unit for applications requiring both rotation speed and significant resolution.

Attention: in this case, the motor shaft must be mechanically free so that the motor can be polarized using a user program w as Motor_polarization.bdm which is to be found under C:\Program Files\Parvex\Pme4.xx\App_Parvex\Samples\Misc\.
The input (in7) and the output (out7) are assigned to this program:

- in7 = 1 authorizes the polarization phase to start.
- out7= 1 when the motor polarization phase is completed.

This program is only given as an example and can be modified according to the customer application.

In addition, a program available under PME (Parameter editor -> Motor/Resolver -> Setting SinCos encoder parameters) can be used to equalize any SINE and COSINE channel offsets as well as any differences in amplitude between the same channels.

The resolution obtained via the SinCos encoder is given by the formula:

RESOLUTION = NUMBER OF ENCODER PERIODS OF SINE X INTERPOLATION FACTOR with the INTERPOLATION FACTOR being approx. equal to 512 points; the interpolation factor is the breakdown of a sinusoidal signal as a given number of points.

The position sensor should be a SinCos encoder with sinusoidal outputs:

- Tracks A, $\overline{A}$, B, $\overline{B}$, Top0, $\overline{Top0}$ (analog).
- 2 signals, A and B, in quadrature and their inverted signals $\overline{A}$ $\overline{B}$, being short circuit resistant.
- Maximum number of authorized encoder periods of sine: 65536 periods/revolution.
- Level of differential peak to peak voltages A $\overline{A}$ and B $\overline{B}$ between 0.8 V (AC) and 1.1 V (AC).
- Power supply +5V.
- Maximum consumption 250 mA.
- Maximum frequency: 200 kHz for the A or B signals.
- An external 24V +/- 10% power supply must be provided to supply the SC6645 option card via the DSM SUB-D X2 (Contact 28: + 24V, Contact 10: 0V). An isolated DC-DC converter (24V /5V), on the option card is used to supply the encoder with 5V. Attention: The external power supply needs to be 24V DC +/- 10%.

5.16.2 SUB-D X3 plug: Encoder input option.

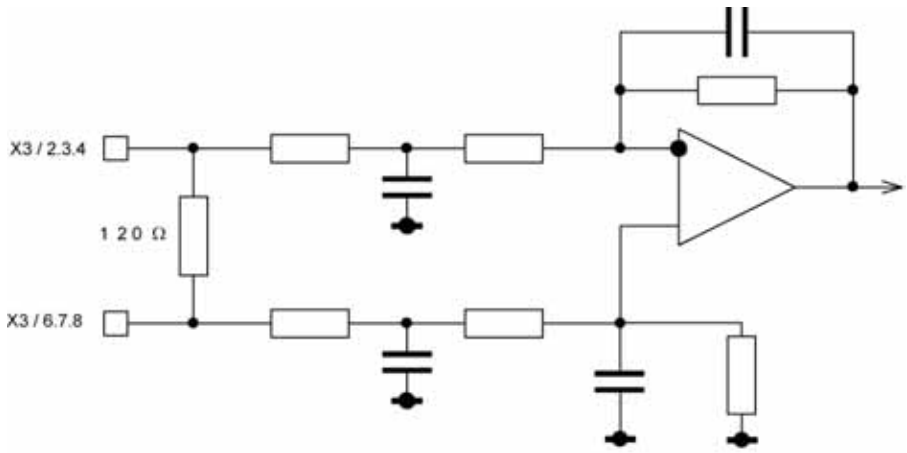
CONTACT	TYPE	ROLE	Characteristics
5	Output	5V	Encoder power supply: maximum output 250 mA.
9	Output	0V	⚠: a +24V power supply for X2-28 / X2-10 plug is required for processing the encoder power supply
7	Input	A	Encoder channel A
			SINE signal (differential inputs)
3	Input	$\overline{A}$	Encoder channel $\overline{A}$
8	Input	B	Encoder channel B
			COSINE signal (differential inputs)
4	Input	$\overline{B}$	Encoder channel $\overline{B}$
6	Input	Top 0	Encoder channel Top 0
			(differential inputs)
2	Input	$\overline{Top\ 0}$	Encoder channel $\overline{Top\ 0}$

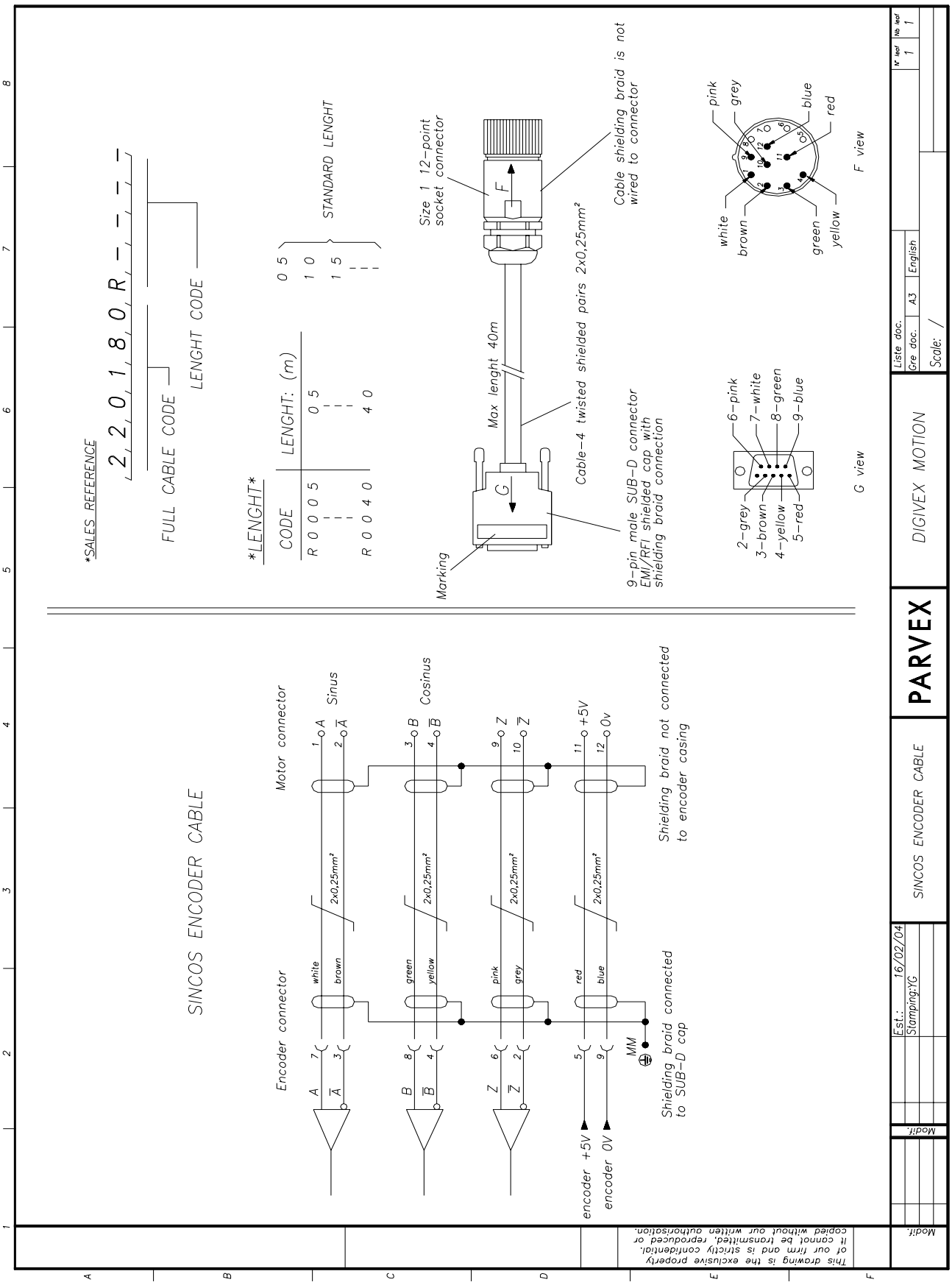
5.16.3 Cables

The DPM connection cable should be made up of 4 twisted pairs, shielded in pairs, with sections greater than or equal to 0.25 mm^2.
The maximum cable length is 40 m. Please consult us for information on longer cable lengths.

There is an approved PARVEX cable for controlling with SinCos encoder.

Input interface:
The input signals for the encoder input card should be sinusoidal and differential with peak to peak values between 0.8 V and 1.1 V.




SINCOS ENCODER CABLE
*SALES REFERENCE
2,2,0,1,8,0,R,_,_,_,_
FULL CABLE CODE
LENGHT CODE
LENGHT
CODE
LENGHT: (m)
R 0 0 0 5
R 0 0 4 0
0 5
4 0
STANDARD LENGHT
0 5
1 0
1 5
Size 1 12-point socket connector
Cable shielding braid is not wired to connector
Max lenght 40m
Cable-4 twisted shielded pairs 2x0,25mm²
9-pin male SUB-D connector EMI/RFI shielded cap with shielding braid connection
Marking
F view
G view
pink
grey
blue
red
white
brown
green
yellow
6-pink
7-white
8-green
9-blue
2-grey
3-brown
4-yellow
5-red
Encoder connector
Motor connector
Sinus
Cosinus
2x0,25mm²
white
brown
green
yellow
pink
grey
red
blue
+5V
0v
Shielding braid not connected to encoder casing
Shielding braid connected to SUB-D cap
encoder +5V
encoder 0V
This drawing is the exclusive property of our firm and is strictly confidential. It cannot be transmitted, reproduced or copied without our written autorisation.
Modif.
Est.: 16/02/04
Stamping:YG
SINCOS ENCODER CABLE
PARVEX
DIGIVEX MOTION
Liste doc.
Gre doc.
A3
English
Scale: /
N° feuil
1
Nb feuil
1

6. COMMISSIONING - DIAGNOSTICS

6.1 Start Up Sequence

6.1.1 Prior Checks

Wiring Check

- Power and auxiliary connections to DIGIVEX Power Motion.
- Wiring of Reset.
- External arrival of 24 V source for motor brake.
- Check resolver connections :
  - at motor end
  - at DIGIVEX Power Motion.
- Check the power, brake and thermal sensor connections :
  - at motor end
  - at DIGIVEX Power Motion.

Power Supply Type Check

- Power : 50/60 Hz, 400V +/- 10% or 480 + 10%.
- Auxiliaries : single-phase, 50/60 Hz, 400 V ± 10% or 480V + 10%.
- Brake supply : 24 V dc ± 10% (ripple included).

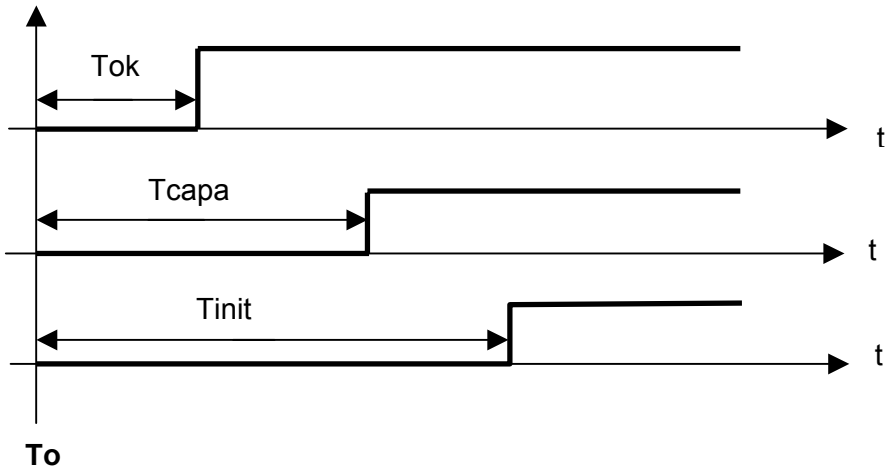
Warning: Before any work make sure that the power bus is at 0 V. Wait at least three minutes after the motors have come to a complete stop before carrying out any work. **Wait for all LEDs to go out.**

6.1.2 Commissioning with PME-DIGIVEX Motion

See the Manual PVD3516

6.2 Initialization Sequence

Description of initialization sequence times:



Upon energizing:

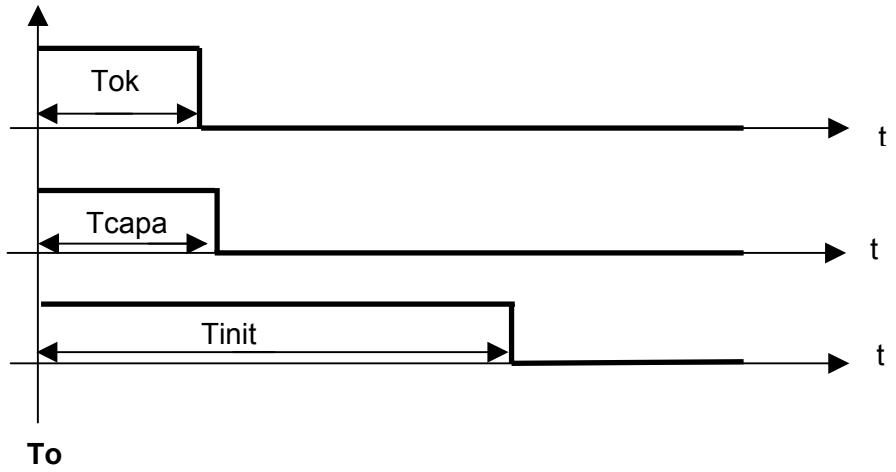
To	<= Mains present
To+30ms < Tok < To+120ms	=> "OK" relay closed (terminal block B6)
To+300ms <Tcapa<To+700ms	=> capacitor preload internal contactor closed
Tinit > Tcapa+60ms	=> INIT signal. (LED POWER ON lights up) The "drive OK" output on plug X2 is set to 24V

The INIT (initialization) signal enables the drive to work.

6.3 Stop Sequence

Attention: In the case of a motor with flux weakening (HV or HW spindle motor), the mains contactor should not be opened when the motor speed is greater than 50 rpm. Opening the contactor may cause overvoltages on the DC power bus and shorten the life of the drive. For emergency stops, we recommend that an electric braking be induced through an action on move_en or emergency_cmd. A waiting period corresponding to the maximum braking time of the motor should be observed before the contactor is opened.

6.3.1 Description of stop sequence times



6.3.2 Stop due to removal of mains

To	<= Removal of mains.
To+3ms < Tcapa < To+60ms	=> Power bridge is stopped and capacitor preload internal contactor is opened.
To+25ms <Tok<To+60ms	=> "OK" relay is opened on terminal block B6.
To+Td < Tinit	=> After a time period Td, approx. 2s, the status of the INIT signal changes. Furthermore, after this time, the "drive OK" output on plug X2 is set to 24V.

6.3.3 Stop following a fault on mains side

To	⇐ Fault detected on mains side
To+3ms < Aff. Def. < To+200ms	⇒ Stop of the power bridge and fault displayed on the power supply status LEDs.
To+25ms <Tok<To+200ms	⇒ The "OK" and "READY" contacts on terminal block B6 open, the power contactor must then open within 100 ms following the "OK" opening.

A restart is only possible after a RESET (on terminal block B7) or via the push button.

6.3.4 Stop following a fault on motor side

Axis motor:

To	<= Fault detected on motor side.
To+3ms:	=> The "drive OK" output on plug X2 changes to 0. The motor is no longer driven, the "FAULT" LED lights up.
To <Tok<To+20ms	=> The "OK" and "READY" contacts on terminal block B6 open, the power contactor must then open within 100 ms following the "OK" opening.

Spindle motor:

To	<= Fault detected on motor side.
To+3ms+Tf:	=> The fault is passed on to the power supply when the motor speed is less than 50 rpm after a time period Tf (Braking time), the "OK" and "ready" contacts then open.

A restart is only possible after a RESET (on terminal block B7) or via the push button. The RESET is not active until the cause of the fault has been removed.

6.4 Detecting Reasons for Stoppage

6.4.1 LED display - power supply function

LED	COLOR	FUNCTION
POWER ON	Green	Power on, with no fault in the supply or in the drive control.
POWER OFF	Red	Auxiliary supply on. No power supply (either because of a fault, or by switching off).
OVER CUR	Red	Internal excess current of supply, or current capacitors charging circuit damaged (current limiting resistor open or internal contactor damaged).
OVER VOLT	Red	Bus and mains overvoltage values are as follows:
PHASE	Red	No mains power phase.

Lit continuously: Mains overvoltage or Bus overvoltage

Bus overvoltage	Mains overvoltage
850V	550Vrms

In normal operation, the LED status is as follows :

- POWER ON Green
- POWER OFF Off
- OVER VOLT Off
- OVER CUR Off
- PHASE Off

Power supply current monitoring:

	DPM 50/80	DPM 100/120	DPM 150	DPM 200	DPM 300
Max bus operating current for 100 ms	50	100	150	200	300
Mains bridge blocking instantaneous current	90	150	210	300	450

6.4.2 Current Monitoring

Drive mean current

Each servoamplifier is characterized by two currents.
For example for a DIGIVEX Power Motion 50/80 :

- permissible permanent current 50A (sine wave peak value),
- maximum pulse current 80A, permissible for a limited time (0.3 - 1 s).

To prevent excessive overheating of the drive the mean current [I = f(t)] is compared after about two seconds filtering with the permanent permissible current (rating).
There is then a choice between two strategies :

- Strategy 1: Fault with opening of the power supply OK relay and the main contactor
- Strategy 2: Reduction of the permanent drive current of 90% of the permanent permissible current. A default 7 display flashes.

Motor rms current

To prevent the motor from being tripped by the thermal sensor, the drive monitors the rms current **[I^2 = f(t)].**

The rms current is compared with the permanent permissible current under slow rotation by the motor $\hat{I}_0$ (after first order filtering). This data is characteristic of the motor and is known to the drive when the motor-drive selection is made.

As before, there is a choice of two strategies :

- Strategy 1: fault
- Strategy 2: reduction of drive pulse current to 0.9 $\hat{I}_0$ motor. A default 7 display flashes.

Drive output current
Two features are monitored :

- Protection against short circuits: Current derivative monitoring.
- Excessive output current (max. I): checks whether the measured current exceeds the drive pulse current by 30%.

In both cases the fault is tripped.

6.4.3 Temperature Monitoring

DIGIVEX Power Motion dissipator temperature

- If the dissipator temperature is less than 70°C nothing happens.
- From 70° to 94°C the pulse current that the drive can deliver is reduced. A default 3 display flashes.
- At 95°C fault tripped.

Servomotor winding temperature
Each motor has a thermal sensor. This sensor may or may not be taken into consideration when customizing the drive. If taken into consideration (usual case), excessive motor temperature causes a fault.

Ambient temperature
Operation is stopped if the ambient temperature measured between the electronic cards exceeds 70°C.

6.4.4 7-segment display status

Function: To provide information on the DIGIVEX status distinguishing between faults.
Description :

Description	Display	status _ number	Status
Stand by without power with execution of application program	0	36	Information
Stand by without power *without execution of application program*	blinking 0	1	Information
Power present with execution of application program	1	21	Information
Power present without execution of application program	blinking 1	2	Information
Resolver failure	2	3	Major Fault
Encoder fault	blinking 2	37	Major Fault
Excessive ambient temperature	3	4	Major Fault
Excessive heatsink temperature	3	5	Major Fault
High heatsink temperature with reduced current	blinking 3	6	Information
Excessive motor speed (in rpm)	4	7	Major Fault
Excessive application speed (in Units/s)	4	35	Major Fault
Excessive supply current	5	8	Major Fault
Excessive variable speed drive current	6	9	Major Fault
Excessive dI/dt	6	10	Major Fault
Excessive average current	7	11	Major Fault
Excessive RMS current	7	13	Major Fault
Excessive average current with reduced current	blinking 7	12	Information
Excessive RMS current with reduced current	blinking 7	14	Information
Bus overvoltage	8	15	Major Fault
Excessive motor temperature	9	16	Major Fault
Option card fault	11	29	Major Fault
Incompatible Axis/Spindle definition	A	17	Major Fault
CAN link fault	b	18	Major Fault
Motor not connected	C	19	Major Fault
User program memory fault	d	20	Major Fault
Emergency stop	E	38	Major Fault
Personalization board missing	F	22	Major Fault
Axis / personalization board incompatible	F	23	Major Fault
Internal parameter calculation fault	F	24	Major Fault
+ Electrical limit reached	H	25	Minor Fault
- Electrical limit reached	H	26	Minor Fault
+ Software limit reached	L	33	Minor Fault
- Software limit reached	L	34	Minor Fault
Program execution fault	P	27	Minor Fault
Tracking error fault	U	28	Major Fault
C167 CPU Fault	.	31	Major Fault
DSP CPU Fault	. blinking	32	Major Fault
Synchronization message timeout	blinking b	41	Minor Fault
Licence missing	blinking F	42	Minor Fault

Major faults cause the OK relay to open.
Minor faults cause an operating error to be displayed.

7. UL CERTIFICATE

Certificate of Compliance

Certificate Number 120104 - E214717
Report Reference E214717, October 23rd, 2003
Issue Date 2004 January 12

Page 1 of 2

Underwriters Laboratories Inc.®

Issued to: PARVEX S A
8 AVE DU LAC
21000 DIJON FRANCE

This is to certify that representative samples of Power Conversion Equipment
Three Phase Input Model DPD, DPM

Have been investigated by Underwriters Laboratories Inc.® in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: **UL 508C - Power Conversion Equipment**
CSA C22.2 No. 14-95 - Industrial Control Equipment

Additional Information: See Addendum for Electrical Ratings

Only those products bearing the UL Listing Mark for the US and Canada should be considered as being covered by UL's Listing and Follow-Up Service meeting the appropriate requirements for US and Canada.

The UL Listing Mark for the US and Canada generally includes: the UL in a circle symbol with "C" and "US" identifiers: c UL us the word "LISTED"; a control number (may be alphanumeric) assigned by UL; and the product category name (product identifier) as indicated in the appropriate UL Directory.

Look for the UL Listing Mark on the product

Issued by: P. Pham /BC
P. PHAM - Project Engineer
UL International France SA

Reviewed by: D. Roul /BC
D. ROUL - Project Engineer
UL International France SA

Pursuant to the Corporate Services Agreement between UL International France SA and Underwriters Laboratories Inc. ("UL"), UL hereby accepts and issues this Certificate of Compliance. For questions in France, you may call 33 0 1 60 19 58 00.

Certificate of Compliance

Certificate Number 120104 - E214717
Report Reference E214717, October 23rd, 2003
Issue Date 2004 January 12

Underwriters Laboratories Inc.®

This is to verify that representative samples of the product as specified on this certificate were tested according to the current UL an c UL requirements.

Electrical Ratings:

The output current ratings below are steady state, 100% values.
Then a linear reduction of the currents based on the temperatures of the heatsink (via NTC) is applied: from 70°C (160%) to 95°C (100%). The drive shuts down when the temperatures of the heatsink (via NTC) reaches 95°C.

Model	Main Input Vac Phase Freq.	Main Input I (A rms)	Output Voltage Vac Phase Freq. range	Output I (A) rms	Short Circuit Rating (A)	Required Branch Circuit Protection Ferraz Class J Time Delay fuse (JDDZ)	Auxiliary input fuse (JDDZ)	Aux. Input Vac Phase	Aux. Input I (A rms)	Automatic control supply (Relay input)
PDP or DPM series	400Vac 3 phases 47-63 Hz	32 A #	0-400 Vac 3 phase 0-1.5 kHz	31 A	5,000	AJT40 (40A)	ATDR2 (2A)	400Vac 1 phase 47-63 Hz	0.2 A max	250Vac Max

Output max. power: 16kW

Thermal Protection Connection for Motor (Connection B4: TH+ and TH-). TH- is referenced to 0 V, 15 V from TH+ to TH-.

Issued by: P. Pham /BE
P. PHAM - Project Engineer
UL International France SA

Reviewed by: D. Roul /BE
D. ROUL - Project Engineer
UL International France SA

Pursuant to the Corporate Services Agreement between UL International France SA and Underwriters Laboratories Inc. ("UL"), UL hereby accepts and issues this Certificate of Compliance.